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CW at ...ip 80

Computers Hit For Killing Jobs

By Nancy French
CW Staff

TOKYO — Computers are job killers and the sooner we accept this, the sooner we will start to deal with the implications effectively, a noted Canadian computer scientist said here last week.

Delivering an invited paper at International Federation for Information Processing's (Ifip) Congress 80, Calvin C. Gotlieb, a professor from the University of Toronto's Computer Science Department, backed up his contention with citations from dozens of studies, reports and surveys published in the last 10 years or so. For example:

• At one U.S. Western Electric Co. switching division, the number of employees was reduced by 50% — from 39,200 to 19,000 — over a six-year period with a corresponding doubling of productivity.

• In Japan, seven color television factories raised their production volume by 25% from 1972 to 1976, with a corresponding decrease of more than

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CW at Info 80

SNA Called Key To Future Office

By Marcia Blumenthal
CW Staff

NEW YORK — "Enterprise systems" is the name IBM has given to its approach for the merger of DP, office systems and communications, and Systems Network Architecture (SNA) will be its foundation.

"IBM is in the office-of-the-future business to stay, and our concept of enterprise systems is an important framework of our solution," according to Allen J. Krowe, IBM vice-president and president of the Systems Communication Division. Delivering the keynote address at the seventh international Information Management Exposition & Conference (Info 80) here last week, Krowe described IBM's enterprise systems concept, pointing to the company's public commitment to that direction made last June.

At that time, IBM announced its Displaywriter, record support for the 5520 and the Distributed Office Support Facility (DOSF) for the 8100 [CW, June 23]. In-house, IBM is now

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Four Big Users Complain

Bell Charged With Inflating Prices

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Four of the country's biggest companies have accused AT&T of using an illegal pricing scheme to increase sales of newly developed terminals and services.

If AT&T is actually using this scheme, it is charging as much as the traffic will bear — which is illegal. A long line of Federal Communications Commission (FCC) decisions have firmly established that the phone company's rates must be based on actual costs.

The attack on the pricing scheme, known within Bell as the Installed Base Migration Strategy, is contained in a complaint recently submitted to the FCC by the Ad Hoc Telecommunications Users Committee on behalf of Ford Motor Co., General Electric Co., U.S. Steel Corp. and Westinghouse Electric Corp.

According to this complaint, the Installed Base Migration Strategy consists essentially of setting a target price for a new terminal or service — such as the Horizon or Dimension PBX — estimating the price customers are willing to pay for the new features embodied in that product, then subtracting that amount from the target price. The remainder becomes the new, increased price for the existing product or service — e.g., a Model 700 PBX.

For example, if the target price for a new product is $100/mo, Bell might determine the customer's willingness to pay for the new features to be $25/mo. If the present price of the existing comparable product is $50, Bell would file a tariff asking that the existing product's price be raised to $75.

The four companies are unhappy about a proposed tariff change AT&T filed last August that would raise rates for Common Control Switching Arrangement (CCSA) local access lines from $7.95/mo to $35/mo, effective next month. A CCSA uses switching facilities in telephone company central offices, on a dedicated basis, to link voice and/or data terminals connected to a large private network. It is now being superceded by a computer-controlled switching system known as

(Continued on Page 8)

Honeywell X.25 Architecture Allows Multivendor Nets

By Brad Schultz
CW Staff

MINNEAPOLIS — Honeywell, Inc. released its "blueprint for products in the 1980s" last week — an X.25-compatible Distributed Systems Architecture (DSA) for integrated communications between multivendor networks.

Honeywell also announced a set of system and hardware products to go with the architecture, including a front-end network processor, distributed network supervisor software and a satellite system based on the Level 6 processor (see story on Page 6).

Differing from IBM's Systems Network Architecture (SNA), which imposes subservience to master systems within a network largely supplied by IBM or plug-compatible vendors, DSA is called the first architecture based on the International Standards Organization (ISO) "open systems connection" reference model.

That model comes from an ISO subcommittee chaired by 1973 Turing Award winner Charles Bachman, a Honeywell senior consultant who recently said, "The rigidly hierarchical approach of master/slave computer relationships is fundamentally wrong [if] all computers . . . are going to have to cooperate with everybody else's computers."

With DSA, the computer configura-

(Continued on Page 6)

Outdated Gear Could Help Spark Air Controller Strike in March

By Marguerite Zientara
CW Staff

WASHINGTON, D.C. — Will the Professional Air Traffic Controllers Organization (Patco), which has lobbied unsuccessfully in recent years for updated air traffic control computer equipment, stage a strike when its present contract runs out next March 15?

In the face of growing suspicion on the part of the Federal Aviation Administration (FAA), Patco members around the country adamantly insist that a strike is not planned.

Unofficially, however, some controllers have hinted that a strike is not an impossibility. "There's a lot of frustration, anger and resentment built up across the country," one Patco member said recently. "It doesn't appear that anybody in the [position] to correct the things we see wrong is willing to do it so far."

Among the things Patco sees as

(Continued on Page 8)

Dues-Paying Analysts Denied Benefits

By Jeffry Beeler
CW West Coast Bureau

TOPEKA, Kan. — More than 30 of the Santa Fe Railway Co.'s systems analysts are reportedly being forced to pay union dues, but are being denied all the benefits of union membership.

This apparent contradiction in the employees' union status was made possible several years ago by a little-publicized agreement between the Santa Fe's management and representatives of an international labor union known as the Brotherhood of Railway and Airline Clerks (Brac).

In essence, the agreement reversed an earlier management-Brac compact that had exempted the railway's systems analysts from paying union dues. Under the new agreement, which was forged without the employees' prior knowledge, all Santa Fe workers promoted to systems analysts after Jan. 1, 1978 have been required to contribute part of each paycheck to Brac's union fund.

One of the agreement's most curious wrinkles, however, is that although it compels the systems analysts to pay union dues, it stops short of placing them under Brac's direct control. Instead, it has plunked them squarely within the authority of the Santa Fe's management.

In effect, then, the agreement disqualifies the systems analysts from receiving any of the union benefits that their dues and paychecks are helping to underwrite.

The agreement also has the effect of placing the employees in a kind of occupational "no-man's-land": as dues payers, they are unquestionably being treated as members of a union, but in practically all other respects

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But CPU Costs $55,000 Less

IPL 'First' to Rival 4331 Group 2

By Rita Shoor
CW Staff

WALTHAM, Mass. — IPL Systems, Inc. has introduced what may be the first plug-compatible processor to compete with IBM's newly announced 4341 Group 2 — for a purchase price some $55,000 less than the IBM model.

Designated the 4446, a 2M-byte version of the processor will be offered for approximately $330,000, according to Steve Ippolito, IPL president. A comparable 4341 Model 2 is quoted by IBM at $385,000.

The processor is the high-end product in IPL's 4400 series of mid-range mainframes and marks the firm's entry into the end-user market-place. The low end of the series is a Model 4436, which is pitched against IBM's 4331 Model 2 but offers double the 4331's channel capacity, IPL claimed. The mid-series 4443 is supposedly comparable to IBM's 4341 Group 1, while offering twice the memory capacity and faster instruction execution.

Incorporating a reloadable control storage design to allow for modification to the systems as IBM's 4300 series architecture changes, the mainframes provide from 1M to 8M bytes of main memory, 1M byte and from two to five block multiplexer channels, according to a spokesman. The maximum channel data transfer rate is reportedly 2M byte/sec.

Series specifications allow for attachment of all peripheral devices which can be connected via 4300 I/O channels, he said, and also include an enhanced service processor with a remote data link that allows machine maintenance to be performed over telephone lines.

Microcode Added

Microcode has been added to handle DOS/VSE operating system Extended Control Program Support (ECPS) with single level addressing and virtual channel addressing. The 4400 family is also fully compatible with VM/370 and VS/1 operating systems.

System architecture includes a central data transfer bus with a reported internal data transfer rate of 80M byte/sec, a main storage bus and a control storage bus, IPL said.

Three levels of support will be offered to 4400 users. On the first level, a microcomputer-based internal service processor assumes control of the system immediately after malfunction. It initiates recovery and diagnostic activity by notifying the program and operator of the problem and performing tests to isolate system faults, an IPL representative explained.

The second level of support is provided by IPL's field service organization with a central diagnostic center available at the third level for handling system problems via telephone through the service processor, he said.

Ippolito acknowledged that the 4443 was essentially an enhanced and repackaged version of the Omega 480 Model 3 manufactured by IPL and marketed by Control Data Corp. However, he described the 4446 as an "entirely new product."

"Each of the three models in our product family is field-upgradable to the next performance level," he stressed. "That means users upgrading from a 4331 performance range machine to 4341 range don't need to replace their existing processors as they would if they had IBM machines."

End-User Market

IPL will be marketing these products to the end-user customer base in addition to its OEM business, and the firm's end-user marketing would be confined to the U.S. There should be no effect on the IPL product line being marketed by Olivetti Corp. in Europe, he maintained.

With a 60-day availability, a typical 1M-byte 4436 is priced at 175,000 and a 2M-byte 4443 costs $225,000, according to the vendor. First customer shipment of the 4446 is slated for the third quarter of 1981 and a 2M-byte version of the system is priced at $330,000, Ippolito said.

Two- and four-year lease plans are also available but he declined to quote specific lease prices. IPL is located at 360 Second Ave., Waltham, Mass. 02154

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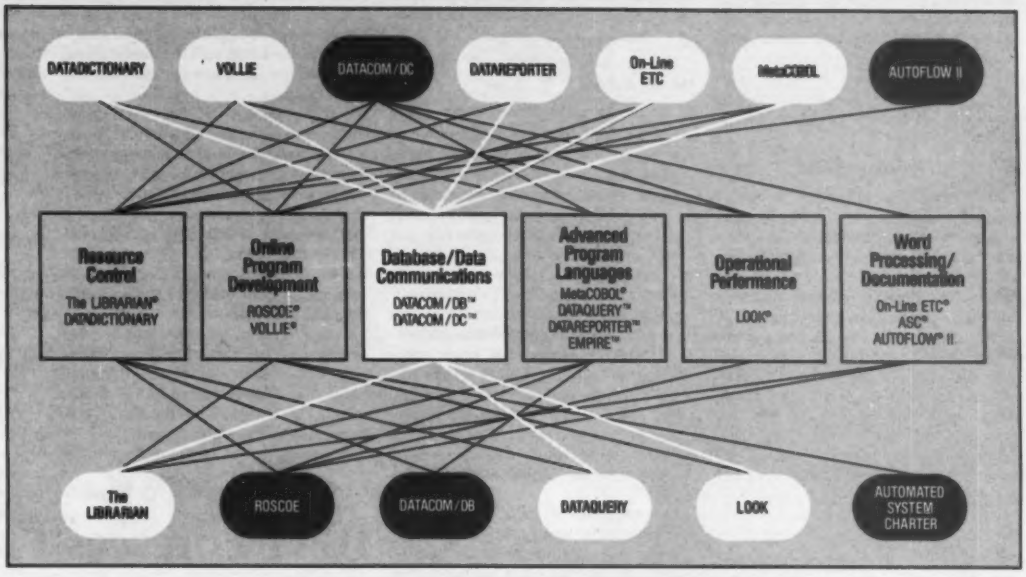

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Canadian Expert Calls Computers Job Killers

(Continued from Page 1)

50% in the number of employees.

Gotlieb defined the term "computer" as including everything from the type of microelectronics that are built into autos and washing machines to large electronic funds transfer networks. The kind of computer involved makes no difference, he said. The person who loses his job because of a computer is still out of work.

Judgment Time

"The time for judgment is now," Gotlieb said. Although much more study remains to be done, "We now have results we can begin to trust. The effects have reached a scale which does allow us to delay in making plans on how to promote these consequences of computers we want to see come about — and how to inhibit the side effects which are socially destructive."

Gotlieb also disagreed with those who argue that computing has increased the number of jobs, saying, "the extra jobs created by the computer industry itself do not begin to make up for the jobs which are lost."

Gotlieb made these additional points:

• Distributed data processing does not necessarily imply distributed control.

• It is too simple to say we cannot stop progress by moving to the pre-computer age. We can control the dissemination of the technology in such a way that we do not create massive un-

Ifip 80 coverage continues on Pages 34, 35 and 36.

employment and job dislocations or subject ourselves to other undesirable side effects.

• Just as we have an environmental impact study before a large plant is built or a pipeline is approved, we could have an employment impact statement before a computer system is approved.

• It is not uncommon for physicists to refuse to work on certain nuclear problems for reasons of conscience. We are not far from the day when individual computer scientists and engineers will have to consult their consciences the same way before working on an application that will undoubtedly cause labor disruption, he said.

The responses of trade unions to the introduction of computers are hardening and will continue to do so, he predicted. In the UK, for example, the Trade Union Congress has adopted two principal points for future action:

• No technology that has major effects on the work force should be introduced unilaterally — full agreement on the range of negotiating issues must be a precondition to the change along with full job security for the existing work force.

• Technological change should be linked to a reduction of the work week and working lifetime — or job sharing.

Moving from levels of employment to kinds of employment, Gotlieb cited experiences reported by factory workers and union leaders. "Their view is that the arrival of process control machines and robots has left them with jobs which are more routine, less interesting and less skilled."

As an example, Gotlieb cited the experience of the Canadian Postal Service with the introduction of postal codes that allowed virtually automatic sorting — and a corresponding announcement by management that remaining work had become less skilled and worth less pay.

Gotlieb called attention to Swedish efforts aimed at returning to workers some level of decision making and helping overcome the fragmentation of work in the manufacture of automobiles. Although much has been written about these experiments in the decade since they've been implemented, the idea has not been widely adopted by auto makers in general.

Indeed, with the advent of microprocessor-driven assembly equipment, "Volvo has said it can now design a plant in which 12 people could produce the present output of 1,200. The implications are enormous," he said.

Gotlieb also pointed to the work of Klaus Lenk in the Federal Republic of Germany, who found that computers generally make things more formal, more routine, more bureaucratic and inevitably lead to a less humane treatment of people.

With irony in his voice, Gotlieb also noted that a law is on the books in the Federal Republic of Germany that says once a decision is made by a computer, no one is permitted to challenge it.

IBM Foresees Future Office

(Continued from Page 1)

using the 8100 with DOSF and will connect it to a central processor running a host-based proprietary application called Disoss that provides document creation, storage and retrieval. After the installation of such a system, secretaries, managers and professionals will be supported by the same system, he noted.

A CW photo feature on Info 80 is on Page 11. Other Info coverage can be found on Pages 10, 12, 13 and 14 and Pages 24 through 33.

SNA is the framework for the enterprise systems. "The 1980s will see us bring enterprise systems to life," Krowe said. During the last decade, every IBM research laboratory was involved in adapting the company's products to the SNA framework concept.

By contrast, today's office systems are a hodgepodge of dissimilar unconnectable machines, grown out of the need to distribute paper more efficiently, and the overall solution has lacked a systems approach, Krowe charged. To combat that, IBM is currently in a "buildup of such scale not seen since the mid 1960s," he added. In particular, Krowe said IBM had not spent enough time on software. Krowe described the key elements of the enterprise systems as numerous "buzzwords flying around the industry." These include:

- A central computer complex.
- Operating systems.
- Data base/data communications programming.
- Access methods.
- Network control programs.
- Distributed processors.
- Multifunction microprocessor-based terminals.
- Office functions.

Moreover, such a system must establish a communications link — a high-speed, wideband communications inside the enterprise and the capability of interconnecting computer networks of unconnected organizations via common-carrier facilities.

The interconnection of these information processing functions is a formidable barrier to systems' designers because of the different data streams, protocols and systems designs currently in use.

Gateway Function

IBM's enterprise systems includes the concept of a gateway function — the ability to integrate all types of information, voice, data, text, facsimile or image. This gateway function is "clearly evolving toward an integration of hardware and software products into increasingly powerful, flexible and efficient gateway nodes," Krowe said.

However, Krowe warned against "the siren song" of being able to attach "any device to any other device" through a communications link. "The problem of myriad product designs and their anomalous and increasingly complex establishment link designs is as significant today as the anomalous network design problems between establishments was in the early 1970s," Krowe said.

Communications Problem

This is an area in which IBM and other vendors will be concentrating a great deal of effort in this decade, Krowe said, adding that many of the concepts behind SNA will fuel IBM's attempt to solve the problem of communications systems.

Driving the solution to these problems is the lack of office productivity, particularly among managers. Krowe maintained there really has not been an increase in office productivity since the turn of the century.

The need for productivity improvement is compounded by the projection that while today in the U.S. there is one terminal installed per 48 workers, by 1986 there will be one terminal for every 10 workers.

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Attendees from 44 Nations

Two-Part World Congress a Tactical Challenge

By Nancy French
CW Staff

TOKYO — More than 2,000 people from 44 countries gathered here last week for the first part of the International Federation for Information Processing's (Ifip) Congress 80, the Eighth World Computer Congress.

A message of welcome by His Imperial Highness, the Crown Prince Akihito, along with a rousing keynote delivered by Michio Nagai, senior consultant of the United Nations University and former Japanese minister of education, opened the congress.

After the presentation of all the invited papers and about half of the submitted papers, the congress — along with its equipment exhibition — moves on to Melbourne, Australia, where the invited papers will be repeated and the other half of the submitted papers will be presented.

Ifip 80 marks the first time Ifip's triennial congress has ever been held in the southern hemisphere, and the first time a congress has been split between two nations, Ifip President Pierre Bobillier said at the opening ceremonies last Monday.

Small Profit

Whether a two-part congress will ever be repeated remains to be seen. Although this conference offers Western attendees — who virtually bubbled around the recently completed Sunshine City Prince Hotel and import mart complex — a rare opportunity to visit locales they would seldom have a chance to visit otherwise, it represents considerable tactical and operational challenges, added expense and very little profit in the end for Ifip, sources said.

Despite its venue, Ifip 80 in Tokyo drew only about 1,500 Japanese and a grand total of 2,300 attendees, sources said, compared with 7,000 in Toronto three years ago.

Exhibit attendance, which was expected to be 30,000 a day, turned out to be about that number.

Addressing the overall Congress 80 theme, "Challenges of a Computer Presence," the 113 papers selected for the congress were culled from more than 600 papers from 47 different countries, F.H. Sumner, chairman of the program committee, said at the opening.

Bobillier reminded participants that Congress 80, which falls on the 20th anniversary of Ifip, gives Ifip members a good opportunity to reexamine the role and purpose of Ifip. "Is Ifip playing the role it should in today's environment?" he asked.

Nagai observed in his keynote remarks that two revolutionary developments — satellite communications and microinformatics and the merging of the two — have opened up an entirely new world of applications in an era of mass diffusion of information.

"It is no exaggeration to say that these technological breakthroughs have resulted in informatization of communication and that we are now living in the age of information explosion," he said. "Yet it should not be forgotten that the basic decisions to forge a better future for men and women in all countries do not lie principally in the field of technological development. What is needed is for every society to find answers to the basic questions of social development and human fulfillment.

"In spite of the great possibilities now accessible as a result of the scientific innovations in the field of communication, millions of people, especially in developing nations, still struggle under the unbearable conditions of subsistence. While it is necessary for the governments and people of developing nations to take the initiative in reforming their basic political, economic and social conditions, the people and governments of industrialized nations also must try their best to cooperate with the Third World.

"It is a great mistake to assume, however, that the citizens of industrialized nations benefit automatically from the growing advancements in communications, for the control of the production and utilization of information processing and telecommunication systems is at present mainly in the hands of government and of major industries.

"Not only should communication resources be made available to all citizens, but these citizens themselves should be encouraged to participate in the production and utilization of these resources," he said.

"Entire nations must be planned and shaped in ways that invite all their citizens to become full-fledged members of the learning society which aims at utilizing communications for human benefit. Such a society does not yet exist," he said.

Nagai called on members of the audience to help plan and shape learning societies throughout the world to make the wisest use of these technological innovations for the realization of human dignity and peace.

CW at Ifip 80

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Honeywell Offers Gear for Value-Added Nets

By Brad Schultz
CW Staff

MINNEAPOLIS — A set of entry-level products aimed mainly at new data communications users and current users needing ties to value-added networks was announced by Honeywell, Inc. here last week to go with the Distributed System Architecture (DSA).

A front-end network processor called the Datanet 8 was introduced as operating asynchronously under firmware control to handle communications in a DSA network. The Datanet 8 attaches to Honeywell's DPS 8 or Level 64/DPS mainframe under the Gcos 8 or Gcos 64 operating system, respectively.

Employing the technology of Honeywell's Level 6 small system, the Datanet 8 network processor can execute up to one million instructions per second and pass data at up to six milion bytes per second through its high-speed bus, a spokesman said. The bus connects to a controller for the console and network processor diskette, he added, as well as to a host interface adapter and to channel interface bases through which peripherals access the host.

Memory Subsystem

Accepting up to 16 communications lines, the Datanet 8's memory subsystem features single- and double-word fetch, self-contained initialize and refresh logic and standard error detection and correction, the spokesman continued. An automatic control function provides a programmable read-only memory extension to the 256K-byte main memory, a system timer and a set of control settings for failure detection and restart.

The network processor accepts two, eight or sixteen channel interface bases and communications with data terminals and subsystems at up to 56,000 bit/sec. Two Datanet 8s may be configured on a single host.

Honeywell also announced the Distributed Network Supervisor (DNS) software, which supports DSA's four communications management layers as well as the terminal management function in a secondary network attached to the Datanet 8.

DNS software supports remote job entry, file transfer to and from a distributed satellite system, time sharing and transaction processing. The software also supports a distributed satellite system's distributed concentration, file transfer, distributed transaction processing and remote batch facilities, as well as local functions such as data entry.

The distributed satellite system (DSS) software was a third DSA announcement. DSS allows a Level 6 processor to function as a satellite system that communicates with a host through a DSA network. Under the Gcos 6 Mod 400/DSS operating system, the DSS is said to offer full, DSA standard communications between satellite applications and Honeywell Level 64/DPS or DPS 8 host applications, using the High-level Data Link Control (HDLC) protocol on leased lines.

Datanet 8 Costs

With a 120 char./sec console, the Datanet 8 network processor costs $45,000 for 16-line support or may be leased on a five-year plan at $1,334/mo.

With options, the Datanet 8 can accept up to 128 lines and cost $88,000 or be leased for five years at $2,525/mo.

The monthly license fee for the DNS software is "approximately" $600, Honeywell said, with a software support service available for another $150/mo.

DSS software is available on an initial license fee at the following schedule: Primary network software, $1,800; node administration, $450; network operator interface, $450; file transfer facility, 64/DSS, $990; file transfer facility, 8/DSS, $990: and distributed concentration facility/-DSS, $1,350.

Honeywell Brings Out SNA Alternative

(Continued from Page 1)

tion does not distort the customer application, according to Bachman. "Technology can and should adapt the computer system to fit the business of an organization," he said.

Layered Architecture

Like the ISO model [CW, June 16], DSA is a layered architecture intended to optimize support for networks that employ the X.25 and X.21 interface protocols for packet- and circuit-switching, respectively. X.25 packet networks include GTE Telenet Communications Corp. and Tymnet, Inc. in the U.S., Datapac in Canada, Transpac in France and Datex-P in West Germany.

DSA's debut marks a major advance in development of Honeywell's Distributed Systems Environment (DSE), a spokesman stated, explaining that DSE is the "overall distributed processing framework within which the company's products function cooperatively."

Honeywell will continue developing products that allow its systems and peripherals to communicate with computers under SNA, the spokesman pointed out.

Within a DSA network, processing systems can work as peers without supervision by a central host, although the architecture allows hierarchical control and hybrid systems configurations. DSA comprises seven functional layers: Four communications management layers at the bottom, two message management layers directly above them and an application layer at the top.

Management Layers

The communications management layers handle data transfers across private or public networks. The lowest of these four layers is designated "physical control"; it defines interfaces between data terminal equipment, whether terminals or computers, and data communications equipment such as modems or links.

The physical control layer of DSA supports the RS-232C and RS-449 modem interfaces in the U.S. as well as V.24 and V.25 interfaces in Europe.

The next highest communications management layer handles data transfers over point-to-point or communications links such as between a host's front-end network processor and a satellite processor. Above this "link control" layer is the "network control" layer, which routes traffic onto the correct links of the physical network, according to Honeywell.

Transport Control

"Transport control" is the fourth and highest communications management layer, providing end-to-end control during transmission within the network. This layer multiplexes data received from the lowest message management layer — "session control" — onto lower communications management layers. Transport control also demultiplexes data flowing in the reverse direction, from lower communications management layers to session control.

Among the message management layers, session control establishes and manages the sessions between two cooperating processes within the same system or in separate systems, Honeywell continued.

The highest of the two message management layers — "presentation control" — reformats or transforms data when necessary so that applications processes can access terminals, devices and other processes in a transparent or virtual mode.

Finally, DSA's topmost layer, the application layer, coordinates such user-visible tasks as transaction processing, file transfers, terminal concentration and remote batching.

Evolutionary Development

When introduced in January 1977, Honeywell called DSE a phased, evolutionary development, the spokesman noted. Now "well along in implementation," DSE's first phase is the common base for what Honeywell gives DP users, he said.

The introduction of DSA initiates the second phase of DSE and lays down the rules by which Honeywell customers with data communications resources may adapt to the integration of computing, telecommunications and office systems technologies, the spokesman indicated.

Honeywell will now support "enhanced distributed processing," he declared, allowing customers to put dispersed facilities on an equal footing. The following phase will allow partitioning of a logical data base across processors — "placing each partition where it is most often used but providing automatic access from all locations."

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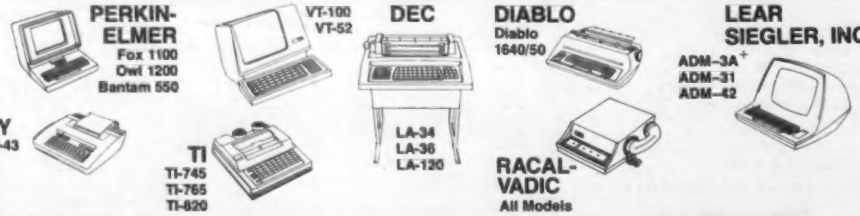

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'Very Basic Matters' Unresolved

Bipartisan Group Asks Nine-Digit Zip Delay

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A bipartisan group of more than 100 congressmen has asked the U.S. Postal Service (USPS) to delay implementing its proposed nine-digit Zip Code.

Citing unanswered questions of cost and the possibility of public confusion over the new codes, the Oct. 2 letter to Postmaster General William F. Bolger asked that the plan be held up "until the Postal Service and the Congress have examined fully the impact of this proposal."

According to Rep. Richardson Preyer (D-N.C.), who initiated the request, there remain "some very basic matters" concerning the plan to add four digits to every existing Zip Code. Implementation of the scheme to increase postal automation is currently scheduled for early next year.

Preyer explained the congressional request to Bolger, saying recent hearings on the new Zips by his Government Information and Individual Rights Subcommittee produced "more uncertainties than answers" from USPS officials.

Preyer said he and his colleagues asked the new codes be delayed "in an effort to get some of these [questions] answered before the Postal Service is irrevocably committed to a costly and complex venture."

The letter said, "We sense great concern in the business community about the cost of changing mailing lists to nine-digit Zip Codes." Testimony before the Preyer subcommittee pointed out possible costly difficulties in adopting the new codes, including expensive expansion of computerized address lists [CW, Sept. 29].

The letter cited "valid" business worries that the new codes might cause "needless confusion." And noting the recent USPS testimony that public cooperation is essential to the new Zip plan, the letter added "It is our considered opinion that you will have neither the help nor confidence of the public if you proceed with the plan as proposed."

Besides sending the letter to Bolger, Preyer and most of the signers also sponsored a Congressional resolution calling for a halt to the Zip Code expansion until its impact can be better assessed and until "other means of improving productivity in the sorting of mail" are considered.

The resolution cited an estimated cost of $1 billion for new USPS equipment to handle the expanded Zip Codes and claimed the Postal Service "has chosen not to examine the cost to businesses, nonprofit organizations and institutions as well as to all levels of government to convert their mailing lists and make other changes" necessary to the plan.

But the strongest criticism of the USPS planning process was in the letter to Bolger, which said, "To date, there appears to have been little if any consideration by the Postal Service of the social impact of the plan, nor real consideration of the cost to mailers and no coordination with existing, presort business mail programs."

According to the Postal Service, Bolger responded to the Oct. 2 letter the next day. Neither the contents nor the substance of Bolger's reply to Preyer had been disclosed at press time last week because Preyer, who is in North Carolina campaigning for reelection, had not had a chance to see the reply.

IBM Cuts Costs On Older Gear

WHITE PLAINS, N.Y. — IBM has announced substantial price cuts on the attached processor (AP) and remote system console for its 370/158 mainframe. The announcement is one more in a continuing series of selective purchase price reductions on the vendor's older equipment.

The firm's Data Processing Division (DPD) slashed some $85,000 from the 3056 AP purchase price by setting the new figure at $200,000. The cost of the 3052 console was cut from $21,840 to $15,290.

Maintenance for the 3052 was lowered from $2,200 to $2,090, but the 3056 maintenance charge was not affected, the spokesman said.

DPD's latest announcement followed in the wake of volume discounts on older models of the 3270 CRT terminals [CW, Aug. 4] and price cuts on both the 3211/3811 printer/controller combination and certain models in the 3420/3803 tape drive/controller family.

Effective Aug. 22, IBM reduced the purchase price of a 3211 from $53,440 to $40,080 and the 3811 controller went from $23,580 to $17,685, a representative said. Just 10 days later, on Sept. 1, the vendor lopped a significant amount from the purchase price of 3420 tape drive models 4, 6 and 8. The Model 4 was cut from $23,050 to $18,440; the Model 6 went from $26,930 to $21,540 and the high-end Model 8 price was reduced from $29,860 to $23,890.

The price of associated 3803 Model 2 controller was cut from $41,390 to $33,110, the spokesman added.

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Logic Argues Against AT&T Pricing Scheme

By Phil Hirsch
CW Washington Bureau

Logically, there are several reasons why AT&T's Installed Base Migration Strategy should not work.

For one, competing suppliers would be able to take customers away from Bell if prices are made arbitrarily high. But that presupposes that competing suppliers exist. The Ad Hoc Telecommunications Users Committee contends that in the case of the Common Control Switching Arrangement (CCSA), for example, there are no viable alternatives except other Bell products — in this case, EPSCS, the computer-based private network switching arrangement.

The same is true of private line services and terminal products in general, according to a knowledgeable source. Existing private-line facilities — terrestrial as well as satellite — are already leased out, and the specialized carriers are not building any more, he explained.

This is partly because high interest rates have made such investments too expensive and partly because the carriers are more interested in the switched dial-up services market, he added.

Analysis

Further Impediment

Another theoretical impediment to the pricing strategy is the Federal Communications Commission (FCC) and state regulatory bodies. They have to accept the phone company's cost justification for all tariffs before those tariffs can become effective.

However, as the Ad Hoc Committee pointed out in its complaint to the FCC, the "entire cost support package" AT&T submitted in the CCSA case "is inherently unauditable." It "relies totally on the subjective judgments of [AT&T] account, market, and group managers."

This same basic complaint has been made repeatedly during the past several years by those opposing Bell tariff filings, and the commission has often agreed with the complaints. The FCC's typical response has been to defer final approval of a new rate, but in the meantime allow it to go into effect while investigating the related costs. (This was how AT&T's 1978 CCSA rate increase was handled.) But the investigation tends to drag on, however, so the rates tend to become permanent.

Four U.S. Giants Cry 'Foul' Over Bell Pricing Scheme

(Continued from Page 1)

the enhanced private Switched Communications Service (EPSCS).

The proposed CCSA rate increase follows one filed by the phone company in December 1978 and subsequently accepted temporarily by the FCC, pending the outcome of an investigation. Since the investigation is still under way, the earlier increase remains in effect.

If the new rate is granted, the Ad Hoc Committee said, it will raise CCSA rates a total of more than 440% within a period of less than two years.

If the new rate is granted, the Ad Hoc Committee said, it will raise CCSA rates a total of more than 440% within a period of less than two years.

But CCSA represents only part of the story.

According to the Ad Hoc Committee, several states have granted AT&T rate increases for PBXs and other terminal equipment during the past few years. Attached to the committee's recent complaint filed with the FCC are documents from two of those proceedings — in Texas and Ohio — that indicate that the installed Base Migration Strategy was used to set the new rates.

"The similarities between the migration strategy which Bell System companies seem to be pursuing for terminal equipment in the states and AT&T's recent CCSA rate increase filings are so striking that any conscientious regulatory body must question whether a migration plan exists for interstate services such as CCSA and EPSCS, and whether [the pending] CCSA rate increases are part of such a plan," the Ad Hoc Committee said.

Meanwhile, both New York Bell and Pacific Bell are trying to raise their charges for CCSA and other long-established private-line services [CW, Aug. 11, Sept. 29]. The New York filing has been shot down, but the Pacific Bell proposal is still pending before the California Public Utilities Commission, and Bell operating companies in a number of other states reportedly are planning to file similar increases if and when the California charges are implemented.

Significantly, this increase would be imposed on virtually all interstate customers leasing private-line facilities from Pacific Bell; the New York filing, by comparison, involved only CCSA and foreign exchange (FX) services.

Morevoer, AT&T last month requested permission to shorten drastically the depreciation rates for its PBXs and other widely used terminal equipment. One part of this proposal calls for depreciating electronic PBXs differently from older versions of the same equipment.

The depreciation "represcription" proposal, if adopted, will increase the company's revenue requirement — i.e., the amount that has to be recovered from interstate customers — by $100 million in 1981. Another result will be to narrow the gap between the prices of new and existing terminal products.

The relationship between "represcription" and the installed Base Migration Strategy is indicated by one of the documents the Ad Hoc Committee cited in its FCC complaint.

According to an Examiner's Report included in the Texas rate case, "The migration plan would entail shortening the economic lives assigned to older generation equipment and repricing such equipment relative to the rates for Flagship products so as to make the latter much more attractive to existing and prospective customers."

'Irrelevant,' AT&T Says

WASHINGTON, D.C. — "An irrelevant allegation" is what an AT&T spokesman labeled the Ad Hoc Telecommunications Users Committee's charge that his company is using an illegal pricing scheme to make its customers replace their existing Bell terminals and services with newer, more expensive ones.

"It's an irrelevant allegation which is simply a last-ditch effort by the Ad Hoc Committee to try to keep the full cost-based rates for [Common Control Switching Arrangements] local access lines from becoming effective," the spokesman told *Computerworld*.

The AT&T representative added that he was "not aware" of the pricing scheme, known as the Installed Base Migration Strategy. "We do no attempt to manipulate customers to migrate to more sophisticated and expensive alternate services," he said.

"However, we certainly do market our new services, just as you'd expect us to. And we do our best to make customers aware of how new and innovative services and products can be of benefit to them."

Will Patco Go on Strike?

(Continued from Page 1)

"wrong" in the present ATC environment is alleged understaffing of both controllers and technical maintenance personnel and undercompensation and antiquated computer equipment linked to their air traffic control (ATC) radarscopes.

Controllers have long decried the lack of modern computer equipment in their facilities — which in the 24 U.S. Air Route Traffic Control Centers (ARTCC) is based on third-generation IBM 360/65 computers.

And although controllers have often blamed computer failures for near midair collisions that endangered air passengers' lives, the FAA steadfastly maintains it is the controller's job to separate air traffic, and if that means dealing with computer outages, so be it. The agency maintains, furthermore, that the equipment's reliability has improved over the last seven years.

That issue may remain a debatable question, but one thing both sides agree on is that any strike action by Patco would be clearly illegal. Patco members are federal employees and, as such, cannot legally strike or stage a traffic slowdown.

Strike 'Common Knowledge'

Nevertheless, the FAA is convinced that is just what will happen next spring. FAA chief Langhorne Bond recently called it "common knowledge" that the controllers plan a walkout. "There are all kinds of clear indications that they are planning a strike," agreed FAA spokesman Jerry Lavey, who noted that Los Angeles controllers have been seen wearing T-shirts reading "One in '81."

In addition, Lavey cited a "detailed strike plan" that is circulating among controllers around the country. Patco Executive Vice-President Bob Meyer, however, called the document "educational" — for use only in the event that Congress should ever change the existing law barring strikes.

Also pointing to a possible strike action, according to the FAA, is the existence of Patco's two-year-old "subsistence fund," bluntly called a "strike fund" by FAA officials.

A strike fund only in the sense that "we've set aside certain dues for use in the event we get the right to strike," Meyer explained. The purse was investigated by the Department of Labor — at the FAA's urging — and found to be "not improper and not illegal," Meyer said. "If we used it [in a strike], that would be a different story."

FAA Appeal

The FAA has appealed the Department of Labor's decision, however, and expects a new ruling from the Federal Labor Relations Board "fairly soon," according to Lavey.

Patco, which wants the right to strike and negotiate on wages and working conditions, would like to see the FAA's regulatory and promotional responsibilities split up into two separate agencies because "we feel there's a conflict between the two," Meyer said.

Such a split could be accomplished through making the FAA a semiindependent agency like the U.S. Postal Service, which would then allow walkouts. "It is our wish and our hope that someday we might have the same rights [to strike] as the workers in Poland," Meyer remarked, adding that such a split is "inevitable" because the FAA is presently "running on yellow lights and an occasional red light in the areas of equipment and personnel."

Although the FAA continues to insist it runs not on red or yellow lights but green ones — that there are no safety, overtime or staffing problems ("except maybe at O'Hare") — the agency has taken Patco's strike threat seriously and has a contingency plan just in case.

If all 15,000 Patco members strike next March, the FAA would be forced to call for a sharp cutback in private plane traffic at most large airports, a possible halt in military training flights and a severe reduction in the number of commercial flights, according to Lavey.

A crew of 5,826 FAA supervisors and staff would try to fill in for the present staff of 17,000 controllers. While the FAA does not expect all controllers to join in a strike, even if one is staged, there is reportedly some concern on the part of the FAA that militant union members may harass nonparticipants and possibly sabotage FAA radar and computer equipment.

Brac Collects Analysts' Dues, Denies Benefits

(Continued from Page 1)

they continue to be classified as part of the Santa Fe's management.

The dual status that the employees apparently are being forced to accept has led to considerable ire and confusion among at least some of the 33 systems analysts that have joined the Santa Fe's computing staff since the latest union agreement took effect almost three years ago.

The experience of Sally Dinkle is a case in point. Last April, Dinkle and several of her Santa Fe colleagues were promoted as a group from programmers to systems analysts. As a programmer, Dinkle had always fallen within Brac's scope of authority and thus had been required to pay union dues.

But when she finally learned she had become a systems analyst, she honestly believed her need to pay dues and remain a Brac member had ended, she said. Dinkle based her conclusion on her belief that the Santa Fe's pre-1978 agreement with Brac was still in effect and that the company's systems analysts were therefore still exempt from union control.

What she failed to realize, of course, was that the agreement had long since been scrapped and had been replaced with the updated version that in effect had brought the railway's systems analysts for the first time within the union's sphere of influence.

Blames Brac

Today, Dinkle recognizes her mistake, but she continues to blame her ignorance on Brac and the Santa Fe's management, neither of which informed her of the company's revised union agreement until many months after it had already taken effect, she said.

The alleged breakdown in communications is also reported to have affected several of Dinkle's colleagues.

Dinkle wasn't officially notified of the change in the railway's union agreement, she said, until late this summer when she and some of her coworkers received a letter reminding them of their obligations to Brac and of their need to continue paying union dues.

The letter, dated last Aug. 16, reportedly came from R.M. Champion, vice-president of the Santa Fe's computing operations.

A spokesman for the railway's management, however, offered another possible explanation for why certain employees were apparently misinformed about the union responsibilities of the company's systems analysts. The spokesman theorized that news of the Santa Fe's revised union agreement did indeed get passed along to Brac's membership, but that a few of the company's systems analysts were inattentive and thus failed to heed the notice.

Regardless of who is ultimately to blame for the misunderstanding, however, Dinkle and most of the other Santa Fe systems analysts have already resigned themselves to the prospect of having to continue to pay union dues. Under the current agreement between Brac and the Santa Fe's management, failure to pay dues can result in an employee's automatic dismissal.

On the other hand, Dinkle and some of her coworkers remain just as adamantly opposed to their current union status as they ever were. Why, she asked, should any employees be compelled to sacrifice part of their take-home pay to help defray the cost of union benefits that they themselves are ineligible to enjoy?

In her view at least, such a requirement is "ridiculous," and apparently her conviction is shared by some of her associates. During the last few weeks, a group of the Santa Fe's disgruntled systems analysts has been conducting an informal poll to find out whether the employees favor seceding from Brac and forming their own independent union.

Thus far, the results of the poll are still inconclusive, but if the proposed secession wins majority approval, the employees' next step would be to seek a hearing before the Washington, D.C.-based National Mediation Board (NMB), an independent federal agency that regulates Brac's authority and administers the Railway Labor Act.

Not the First

The Santa Fe Railway Co. is not the only firm where information systems professionals have found themselves compelled to join a labor union by the Brotherhood of Railway and Airline Clerks (Brac).

Similar instances of forced unionization are being reported at Western Airlines Co. [CW, Aug. 18] and the Union Pacific Railroad Co. [CW, Sept. 15].

Brac's recruiting practices at these and other transportation providers suggest the international labor union has embarked on a nationwide membership drive.

Behind Brac's recruiting push lies the union's apparent belief that the transportation field's rapidly growing management information systems ranks represent a major opportunity to extend its control into what has previously been a nonunionized domain.

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IBMer Pans JCL, Eyes Command Languages

By Tom Henkel
CW Staff

NEW YORK — IBM made a mistake when it created its job control language (JCL).

Speaking before attendees at the Info 80 conference here, John B. McKeehan, IBM's language support manager, said JCL, which is a translator that changes a user's code into something the CPU can understand, is too big and too inhuman to be of much good. Given the chance to do it all over again, McKeehan said, the control language would have more human qualities and it wouldn't be quite as structured as it is now.

"If it's too easy, the user gets bored," McKeehan said, adding that control program developers must develop a system that is a balance between the supermachine and the total human — both concepts are impossible, he noted. The ideal control program would be something the user could outwit, thus giving the user the same sort of control available in early systems — before there was a buffer between the user and the operating system.

Today's systems, he continued, only offer users a slice of computing, such as time-sharing or resource sharing.

All Antiquated

But not only IBM's JCL is behind the times. McKeehan said every vendor's command language is antiquated — and was released that way. Speaking as a member of an International Federation of Information Processing (Ifip) committee to study the control language problem, McKeehan said the answer to an improved control language will have to come either from universities or from private study groups, such as the Ifip committee.

CW at Info 80

But while vowing, "We will never do anything like JCL again," McKeehan noted there are always new problems cropping up to throw roadblocks in the face of groups trying to improve command languages. The current roadblock is the trend to distributed data processing, a concept that causes "frightful" problems for control languages, he said.

Chairman of the command language panel, Thomas J. Harris, representing Digital Equipment Corp. and currently chairman of the Codasyl committee on command languages, said standardization of command languages is a must, but who will determine what command languages are best is a difficult question. He added that other groups, including the National Bureau of Standards, and Ansi are working to build a command language standard.

Codasyl wants a transportable command language, while other committees have yet to make firm recommendations.

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Info 80 attendees got down to their shirt sleeves in order to study all the equipment on the exhibit floor.

Info 80

A CW Photo Feature
By Ann Dooley

Lillian Wolfe and George Smith work on Exxon Information Systems, Inc. Vydec word processing system.

Qantel's business package holds the interest of (left to right) Dick Alvo, Mike McCorry and Bill Sterling.

Hazeltine Corp.'s Les Redan discusses the merits of Opus 80.

As Info 80 proceeds inside, the New York City beat goes on outside.

A Bird's Eye View

Registration Crowd Awaiting Opening of Info 80

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Panel Suggests Ways of Hanging Onto DPers

By Connie Winkler
CW Staff

NEW YORK — Managing DP personnel in the 1980s will require new thinking — options on fringe benefits and retirement, bonuses or perhaps income counseling so that high salaries do not go down the inflation tube. Businesses will also have to develop what one company calls a human resource management system that includes a football-like draft.

"It is obvious management must focus upon better and more innovative ways to cope with the unrelenting demand for computer people," Charles D. LaBelle said. "The old ways will not suffice."

LaBelle was a panelist on "The 'People Side' of EDP — A Major Consideration for Productivity Improvement in the DP Organization" session at the

CW at Info 80

Information Management Exposition & Conference (Info 80).

Companies of all sizes not only need to have a career progression program, they need to try innovative ideas to keep employees happy, said John W. Konvalinka, a partner at Arthur Andersen & Co. H suggested an income counseling program so that employees can deal with their incomes in an inflationary environment and are able to buy a home in the area they want to live.

Konvalinka said he was talking more and more with people about the stresses of the job, those things that get in the way of the employee working and functioning professionally. "There are more things going on in people than the code they write," the consultant said.

Individualized Benefits

Pulling an idea from Peter Drucker, LaBelle also endorsed individualized fringe benefits. The benefits policy should be options from which the individual chooses the total package giving the most for the money available. "The choice as to which benefits are the right ones for this or that individual is then best made by the individual alone," LaBelle said.

And when it gets to traditional retirement time, "employees themselves in developed countries are going to insist that they be given ... freedom of choice on second careers, freedom of choice as to whether to retire at a given age or to stay on working, freedom of choice largely in their job assignments as well."

LaBelle, vice-president of human resources, operations division, at Manufacturers Hanover Trust Co. (MHT), pointed out another bank, Bankers Trust Co., is offering DP employees bonuses.

"I feel individuals will gravitate to those companies that show creativity in their remuneration methods," LaBelle said.

Structured Systems

But, the really critical factor to retain good employees is what LaBelle dubs the "proper people environment," and to grow that at MHT he has introduced a structured human resource management system that is automated at MHT.

Behind the system at MHT is a human resources management support group that acts as the clearinghouse for DP employees and the managers who need them. The football-like draft comes into play with a job requisition from a project or product manager. Human resources then determines the best way to secure the employee — either an entry employee, present employee or consultant.

A list of the potential employees within MHT is compiled and they are ranked; then beginning at the top of the list they are approached about the new job. Initially managers did not want to give up their present employees, but that has changed, LaBelle said. "The draft counteracts the employees' feeling that they're doing their job in a particular area and no one knows about it," the vice-president said.

Managers can veto a draft of one of their present employees, but they have to come up with a seccession plan for that employee in six months, LaBelle said.

Additionally, in the MHT scheme there are definite career paths within the company, a skills glossary and each employees skills are tracked. There are at least annual career counseling sessions with managers so that careers can be evaluated and additional education made available.

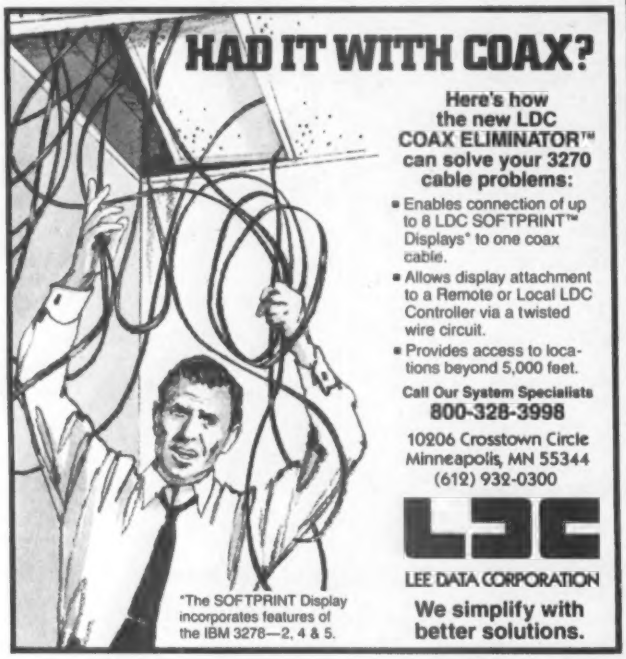
Such a system, LaBelle said, allows MHT to reach people in a "personalized way, through a system, without relying solely on the style of the manager."

Managerial Accountability

For managers, LaBelle recommended managerial accountability. "A manager is entrusted with a total dollar value of human resources. His or her job is to accomplish work and, I submit, to enhance the total value of those human resources," LaBelle said. Along this reasoning the human resource value is enhanced by retaining good performers, educating them, adding new resources to the organization and minimizing turnover.

This value is decreased by losing good performers, neglecting education, making poor assignments, not being able to add new people and not controlling turnover.

The costs of keeping good people can be compared with the costs of replacing them — agency fees, consultant premiums, separation pay and lost productivity, LaBelle said.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Datapro Issues Directory Update

DELRAN, N.J. — The newly updated *Directory of DP Suppliers*, containing profiles of nearly 1,000 companies that supply all types of products and services of interest to computer users, planners, designers, vendors and operating staff, is now available from Datapro Research Corp.

This 200-page directory was designed to help DP management choose suitably qualified vendors by describing each company's location, size, management, financial status, product line and sales and service organization.

The 1980 *Directory of DP Suppliers* is available for $25 per copy from Datapro at 1805 Underwood, Blvd., Delran, N.J., 08075.

Targets First-Time User

Basic Four System Meshes DP, WP Functions

By Marcia Blumenthal
CW Staff

NEW YORK — Building on its strategy to offer systems that perform both DP and word processing (WP), Basic Four Information Systems Division introduced its Spectrum 80 system here recently. First shown at the seventh international Information Management Exposition & Conference (Info 80), the Spectrum 80 is the first Basic Four system to offer users full data and word processing functions within the same system, the company said.

The Spectrum 80's architecture consists of a central File Management Computer (FMC) as well as Infocenter workstations which include a processor and peripheral equipment capable of handling both WP and DP functions.

The FMC does no application processing. Instead, it manages and schedules the resources of the system. It performs functions such as disk access, spooling and caching of disk, according to David Seigle, vice-president of planning.

This system includes a CPU with 64K bytes of main memory, 2M-byte fixed disk and 1.2M-byte diskette drive.

Up to four Infocenters, 17M bytes of fixed disk and an additional 1.2M-byte flexible disk and two additional printers can be configured with the FMC with minimal impact on processing performance, the vendor said.

Infocenters Featured

The system features three basic types of Infocenters and a fourth optional Infocenter. The DP Infocenter, designed to handle general accounting functions, features a multifunctional processing computer (MPC) with a 12-in. screen, 64K bytes of main memory and an 80 char./sec bidirectional printer.

The Word Processing Infocenter also has an MPC with a 15-in. full-page display screen, 65K bytes of main memory and a 45 char./sec letter-quality printer. The WP Infocenter uses Dataword II, Basic Four's word processing software.

The Information Processing Infocenter allows both WP and DP functions to take place concurrently within the system. This workstation features an MPC with 65K bytes of main memory, a 15-in. full-page display and a 120 char./sec bidirectional printer.

CW at Info 80

Prospective users of the Spectrum 80 are first-time users and those Basic Four system users, or other host system users, who want to distribute applications from their existing systems via communications to one or multiple Spectrum 80s.

Although not necessarily geared to the low-end user, the basic Spectrum 80 configuration priced at $15,990, is the company's lowest priced system offering.

The FMC and Infocenters are priced separately: The price for the FMC is $6,790; the DP Infocenter $9,200; the WP Infocenter $10,690; and the Information Processing Infocenter $11,150.

Most features of the system are currently available, with others due to be available no later than the second quarter of 1981. The system can be delivered in 90 days, Basic Four said.

Basic Four, a division of Management Assistance, Inc., is headquartered at 14101 Myford Road, Tusin, Calif. 92680.

IEEE Sets Committee On Micro Interface

SAN FRANCISCO — The Institute of Electrical and Electronics Engineers (IEEE) has formed a standards committee to establish a Microprocessor Operating System Interface (Mosi).

The charter of the committee is to provide for portability of higher-level software upon microprocessor operating systems.

The initial meeting of the Mosi committee will be held here Nov. 13-14. Further details are available from Jack Cowan, Intel Corp., 5200 N.E. Elam Young Parkway, Hillsboro, Ore. 97123.

Drucker to Speak At ASI Conference

CHICAGO — Peter F. Drucker, the management consultant and author of the recently published *Managing in Turbulent Times*, will be the featured luncheon speaker at Advanced Systems, Inc.'s (ASI) 12th annual users conference here Nov. 18-19.

Because Drucker lives in California and "prefers not to travel," ASI said, his presentation will be beamed by satellite to the banquet hall of the Chicago Marriott.

The theme of the conference is "Spectrum '80: Delivery Systems of the '80s." The registration fee is $250 in advance or $295 at the door, ASI said from 2340 S. Arlington Heights Road, Arlington Heights, Ill. 60005.

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'Specifier' Allows On-Line Application Designs

NEW YORK – Genasys International, Inc. has introduced Specifier, a system design tool that allows systems analysts and users to create application designs on-line.

Announced during the seventh international Information Management Exposition & Conference (Info 80) here recently, the package can be used with the company's Genasys system or purchased as a stand-alone package.

On a stand-alone basis, Specifier allows users to create applications on-line through the design documentation level, according to Bruce Tarr, vice-president of marketing.

The package features a tutorial and help facility including prompting on the details of the reports and the screens that are desired, where the data needed for these outputs can be found and what files, data base segments and procedures are needed to transform the data into the desired design.

Currently the system can run only in an IBM Command Level CICS/VS environment and requires a Cobol compiler. In the near future, the firm intends to offer versions of Specifier for other on-line environments, according to Gary Guttman, the company's president.

Used in conjunction with the firm's Genasys system, Specifier adds on-line capability to the batch-oriented basic Genasys product. Genasys, a product marketed by the firm for the past seven years, produces not only design documentation, but generates Cobol or PL/I source programs and produces final documentation once those programs are tested and debugged. Moreover, Specifier used within Genasys can also be used to build a data base.

Genasys works most efficiently when it has access to Assembler H under IBM's OS/VS, but it can also be used with assemblers in the DOS/-VS environment, Tarr noted.

Specifier costs $52,500 when licensed as a stand-alone support package. It is not available on a lease basis. When licensed as a front end to the complete Genasys development system, Specifier's purchase price is $12,500 and leases for $6,000 monthly bundled with the Genasys system.

The vendor is located at 17 E. 45th St., New York, N.Y. 10017.

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With so many matrix printers on the market today, it may seem tough to find exactly the right one for your application. Some models may offer the speed you need, others the communications flexibility and still others the forms handling capability. But no printer offers all the features you need...until now.

The DS180 matrix printer provides the total package of performance features and reliability required for applications such as CRT slave copy, remote terminal networks and small to mid-range systems. Not a "hobby-grade" printer, the DS180 is a real workhorse designed to handle your most demanding printer requirements. And pricing on the DS180 is hundreds of dollars below competitive units.

High Speed Printing—Bidirectional, logic-seeking printing at 180 cps offers throughput of over 200 lpm on average text. A 9-wire printhead life-tested at 650 million characters generates a 9x7 matrix with true lower case descenders and underlining.

Non-volatile Format Retention—a unique programming keypad featuring a non-volatile memory allows the user to configure the DS180 for virtually any application. Top of form, horizontal and vertical tabs, perforation skipover, communications parameters and many other features may be programmed and stored from the keypad. When your system is powered down, the format is retained in memory. The DS180 even remembers the line where you stopped printing. There is no need to reset the top of form, margins, baud rate, etc....it's all stored in the memory. If you need to reconfigure for another application, simply load a new format into the memory.

Communications Versatility—The DS180 offers three interfaces including RS232, current loop and 8-bit parallel. Baud rates from 110-9600 may be selected. A 1K buffer and X-on, X-off handshaking ensure optimum throughput.

Forms Handling Flexibility—Adjustable tractors accommodate forms from 3"-15". The adjustable head can print 6-part forms crisply and clearly making the DS180 ideal for printing multipart invoices and shipping documents. Forms can be fed from the front or the bottom.

If you would like more information on how the DS180's low-cost total printer package can fill your application, give us a call at Datasouth. The DS180 is available for 30-day delivery from our sales/service distributors throughout the U.S.

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Meet Slated On Security

BOSTON – The Seventh Annual Computer Security Conference and Exhibition will take place here Nov. 10-13. Participants may choose from 48 workshops at the four-day program, which is being conducted by the Computer Security Institute.

Speakers at the event will include IBM's Robert Courtney, Univac's Director of Computer Science Carl Hammer and David Dobkin of the University of Arizona. Sessions will span the establishment of a security program through advanced risk-analysis for small and large businesses.

Registration costs for the program vary. More information is available from the Computer Security Institute, 5 Kane Industrial Drive, Hudson, Mass. 01749.

Seminars Planned On Managing IP

BUFFALO, N.Y. – A series of six seminars on information processing (IP) management will be conducted by the Computer Task Group, Inc. (CTG) this fall. "Distributed Systems" will be held here on Oct. 14-15, in New York City on Oct. 20-21 and in Philadelphia on Nov. 13-14.

"Data Management" is scheduled in Pittsburgh, Pa., on Oct. 30-31, Washington, D.C., on Nov. 10-11 and Chicago on Dec. 4-5.

The registration fee for these seminars is $295. Further details are available from Midge Woolley at CTG, 800 Delaware Ave., Buffalo, N.Y. 14209.

Twenty-Five Cases, $83,742

Matching Uncovers Two-State Welfare Fraud

By Ann Dooley
CW Staff

HARRISBURG, Pa. — Twenty-five cases of welfare fraud totaling $83,742 in illegal payments have been uncovered by matching state welfare rolls in Pennsylvania and Ohio.

All those involved in these cases allegedly applied for welfare payments in one state and at the same time received money from the other state, according to the Pennsylvania auditor general's office here. Only after a state computer here was used to match the names, birth dates and Social Security numbers of medical assistance recipients from the two states were the double payments discovered, Executive Auditor General John Kerr stated.

All of the cases involved the Aid to Families with Dependent Children (AFDC) program. Of the total illegal payments, $45,481 was collected from Pennsylvania and $38,261 from Ohio. Ten cases involved children who were claimed by one adult in one state and a different adult in the neighboring state. In the remaining 15 cases, the recipients allegedly "double-dipped," meaning they collected assistance from both states.

Individual instances of fraud were reported to have ranged from $195 to $4,431 and occurred from August 1968 to the present. More than 787,000 recipients were on public assistance in the state as of June 1980, accounting for 6.7% of the state's population.

The automated match was a special effort coordinated through the auditor's offices of both states, according to Joe Theurer, Pennsylvania's deputy auditor general.

Pennsylvania currently has no regular matching program for welfare fraud, although the state is now setting up a new computer system to monitor Medicaid fraud. The department wants to perform another match with welfare data from the Delaware-Maryland-New Jersey-Philadelphia region, Theurer said.

The auditor's office would like to find as many ways as possible to cross-match welfare data so that matches can eventually be implemented on a regular basis and is encouraging the Welfare Department to take a more active role, Theurer said. Since the auditor general's office functions as a monitoring body, it has no power to prosecute.

The evidence collected from the match was turned over to the various county boards of public assistance, which must either challenge the findings or forward the cases for prosecution within 30 days to the Welfare Department's Bureau of Claim Settlement, Theurer noted.

If the recipients involved are brought to trial and found guilty, Theurer expects restitution and/or sentences.

Credit Records Illicitly Accessed At DP Center

By Jeffry Beeler
CW West Coast Bureau

LOS ANGELES — The privacy of scores, perhaps even hundreds, of northern California residents may have been seriously compromised earlier this year when their confidential credit records were fraudulently retrieved from a local credit bureau's computing center.

Through a ruse that still is not fully understood, at least one unauthorized individual apparently gained possession of a password that permits access to TRW Credit Data, Inc.'s data base, which lists the charge account numbers, Social Security numbers and similar information for thousands of credit card holders. The password belonged to the southern California offices of Beneficial Finance Co.

All the unauthorized inquiries were apparently received over the telephone and were fielded routinely by TRW employees.

As a result of the illicit scheme, an unknown individual earlier this year gained illegal access to four charge-account numbers belonging to a northern California couple named Alan and Clare Kahn. The individual then used the numbers to fraudulently order more than $2,000 worth of merchandise over the telephone [CW, June 23]. Were the Kahns the only people whose charge account numbers were illegally used, or did the scheme claim many other victims as well? At this point, no one can say for sure.

But an ongoing investigation of the Kahn case has uncovered "literally hundreds" of possibly suspicious phone inquiries into TRW's credit profiles, according to Larry Anderson, a Beneficial Finance field supervisor based in southern California. All the inquiries were apparently made under the same Beneficial Finance account number, and all the targets of phone inquiries were apparently charge card holders living in the San Francisco Bay area.

Earlier this summer, an investigation was launched in an attempt to trace the unexplained inquiries back to their source, but thus far, the effort has made little headway.

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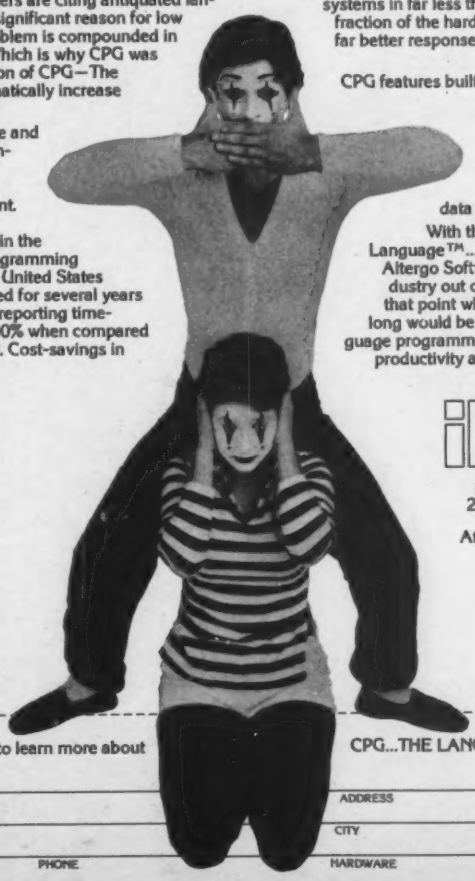

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Violence Mars Minneapolis Newspaper Strike

Marguerite Zientara
CW Staff

MINNEAPOLIS — Violence erupted at the picket line of striking Minneapolis Star and Tribune Co. union members last week [CW, Sept. 29], resulting in the hospitalization of an 18-year-old man.

Steven Tursso was allegedly struck on the head "by the temple" by a male picket while carrying an armful of newspapers he had bought to sell in his family's convenience store in Cedar, Minn., according to his mother.

The strike, in which about 650 members of three unions are disputing salary, fringe benefits and electronic newspaper production issues, entered its fourth week last Sunday, the day of the alleged incident.

Since the workers struck Sept. 13, the Turssos' store had been without Sunday papers, causing "a big dip in business," according to Tursso's mother.

"When they announced on the radio that people could go down there and buy the papers, we discussed it and Steve decided to go," she recalled. "It was his last trip out [of the plant], he had his arms full of papers, and he was hit from behind by a man's fist."

Unconscious "off and on" for "about 10 minutes," Tursso was hospitalized for two days and "at this point he's all right," she said last week. "They also banged his glasses up pretty well, and he has to get new ones because he can't see without them."

Declining to say whether a formal complaint has been or will be filed against a union or an individual in the case, Tursso's mother added that it is a "very hard decision to make" whether or not Tursso should go back to buy more papers for the store. At the time of the reported incident, he was attempting to buy 150 papers, all of which he did procure.

Union Unavailable

While union spokesmen were not available for comment on the incident last week, management spokesman Lee Canning confirmed the incident, but declined to comment on it.

When asked if a settlement was near, business manager Canning replied, "I hope so. I thought we had [a settlement] last night, but we're not quite there."

On strike are 450 members of the Twin Cities Newspaper Guild, including reporters, copy editors, photographers, circulation district managers, promotional personnel, copy aides, news technicians and clerical workers. In addition, 170 members of the Mailers Union Local 4 and about 20 Machinists Union members are participating.

The other 10 unions represented in the plant are honoring the picket lines.

Meanwhile, limited editions of the morning *Tribune* and the afternoon *Star* are being published by 600 management and nonunion personnel and sold "out the front door," according to Canning.

The controversy surrounding the papers' plan to enter Compuserve, Inc.,s experimental electronic newspaper project next spring or summer concerns both job security and profits.

The Newspaper Guild's present contract calls for members to get 25% of the profit of any material that is resold by the paper to a third party. "The company has proposed striking that language from the contract so that there would be no obligation on them to pay for material sold electronically," a Guild spokesman said recently.

MSI Winners To Programs Test

COSTA MESA, Calif. — The winning application programs entered in MSI Data Corp.'s competition to devise applications for its Omega generation of portable data entry terminals will be put into practice by their creators.

Mike Rabin, a 22 year-old management systems analyst from Tennessee, will be flown to Tokyo and San Francisco to measure the performance of those citie's subway systems using a MSI/88f user-programmable portable data entry terminal.

Standing on the platform, Rabin will measure passenger loading and enter a percentage estimate of how many are sitting as opposed to standing. While waiting for trains he will survey commuter reactions to the service provided.

Rabin will telephone the data collected to MSI's computer in Costa Mesa for processing and comparison to other studies completed on transit systems.

The second winner, Dr. Ralph Grams, will stay in his hometown of Gainesville, Fla., where he will test his application to save time for nurses processing patient information at the University of Florida's College of Medicine.

Grams has devised a plan whereby on-duty nurses enter patient data on the terminals as they perform their rounds. The information is formatted and printed at a nurse station.

MSI received 500 entries for the competition, which had as its prize a test of the winning applications at MSI's expense. Imaginative programmers suggested such trips as data collection on the physical attributes of sun worshippers on the world's beaches or surveying the business practices of prostitutes in European cities.

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Regional Conferences Planned

DPMA Steps Up Efforts on Model Curriculum

By Jeffry Beeler
CW West Coast Bureau

POMONA, Calif. — Starting late this month, the Educational Foundation of the Data Processing Management Association (DPMA) will sponsor a series of five regional conferences that will mark another step forward in efforts to develop a model curriculum for undergraduate business computing instruction.

The one-day conferences will provide an opportunity to review and revise the work accomplished thus far in a curriculum development project that began early last year and is scheduled for completion late next spring.

The first in the series of regional conferences will take place Oct. 23 in St. Louis, according to Dr. Thomas Athey, chairman of the Information Systems Department at California State Polytechnic University. Four similar conferences will then follow on Jan. 7 in Dallas, Jan. 9 in Miami, March 18 in Toronto and March 20 in Washington, D.C.

Participants are expected to represent a broad cross-section of the computer-oriented community and will include computing professionals from industry, academic and textbook publishing circles. All qualified representatives from any of these three backgrounds are invited to attend the regional conferences and express their views on the question of what an undergraduate business-computing curriculum should consist of and how it should be taught, Athey said.

Uniform Guidelines

The main purpose for holding the five regional conferences is to lay the foundation for a course of study that will provide junior and senior colleges throughout the U.S. with a set of uniform guidelines for teaching business computing during the 1980s.

Such a model curriculum is based on the premise that business computing should be taught differently from scientific computing and is geared primarily to preparing information systems students to enter the commercial work force as entry-level programmers and analysts, Athey said.

Efforts to implement the model curriculum were originally spearheaded by Athey and several of his colleagues at Cal Poly. Since then, however, the main driving force behind the curriculum's development has reportedly shifted from Cal Poly to the DPMA's Educational Foundation, headed by Don Price, dean of Sierra College's Computing Information Services in Rocklin, Calif.

Early Milestone

One of the first milestones in the curriculum's gradual emergence came late last January when Cal Poly hosted a two-day workshop to sketch the proposed model's preliminary framework. The workshop attracted more than 100 representatives from businesses, colleges and textbook publishing outfits throughout the U.S.

By the end of the conference, the attendees had defined the preliminary requirements for 10 "core courses" they believed would be prerequisite for any effective undergraduate business computing curriculum.

After the workshop delegates finished their business and went home, the model curriculum's six-member executive committee mailed the conference's preliminary findings to a selected audience of several hundred expert advisors and asked them for their comments. Some 200 of the advisors responded to the inquiry and noted their recommendations on an accompanying questionnaire.

The executive committee then interpreted the responses and incorporated the best of the suggestions into the original model to produce a revised curriculum.

Next Step

The next step in the curriculum's ongoing development is to present the results of the first workshop to the participants at the five regional conferences, where the revised model will undoubtedly undergo still more scrutiny and refinements. At the same time, the executive committee plans to distribute a second round of questionnaires to solicit additional reaction to the revised curriculum's form and content.

As before, the best of the recommendations from both the regional conferences and the second round of questionnaires will then be added to the curriculum's current version to produce a final model that is expected to be ready for formal presentation early next May at the National Computer Conference, Athey said.

Athey described the executive committee's curriculum development strategy as a "top-down" approach in which the model's basic framework is established first, and its details are filled in later.

More information about the model curriculum for undergraduate business-computing instruction may be obtained from Dr. Thomas Athey, Information Systems Department, California State Polytechnic University, 3801 W. Temple Ave., Pomona, Calif. 91768.

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CW 10/13/80

Take It Easy at First, New Managers Told

NEWINGTON, Conn. — When a newly appointed DP manager takes over his crew, his initial interactions should be productive to avoid tension and resentment within the ranks. Those are the recommendations set forth in the August issue of *Getting Ahead in DP*, published by The Meld Publishing Co. here.

In meeting the employees he will be managing, a DP manager should try to make a good initial impression, the newsletter counseled. "Expressing pleasure at being able to work with them and confidence that they are going to provide valuable contributions will help," the article said.

In addition, the manager should express his commitment "to do all [he] can to help them succeed in their jobs," according to the article.

Furthermore, "it is important for the employees to understand why the organizational change has taken place," the newsletter observed. To that end, the DP manager should explain the knowledge and experience he hopes to contribute to the unit's efforts.

In addition, he should tell each employee, in detail, the role each will play toward achieving the unit's goals. "Asking the employee for recommendations on how the unit's goals can be accomplished, and asking for help in creating a smooth implementation will further enhance the initial contact."

Show Concern

To alleviate possible antagonism toward himself, the new manager should allow employees at the start to express concerns they may have about the organizational changes. Such action "establishes up front, an open relationship between you and the employee, and creates a comfortable, productive environment," the article said.

A new supervisor should also set consistent, measurable work standards so that employees will know they will be evaluated and treated fairly. "Ask for the employee's ideas on standards for their work, consult with them to create a mutually acceptable group of standards."

A regular review schedule should be established, which also provides an opportunity for ongoing discussions about how both management and employees feel about the situation.

As the supervisor makes his first delegation of work to the group, he should describe both the task to be accomplished and the reason for it. This will "increase the likelihood that the work will be done correctly and that the employee's awareness of the rationale will help them to feel better about doing the work," according to the article.

Lastly, the manager should ask the employees for ideas on how the work can be done and "look to them for a plan to accomplish the tasks," the report concluded.

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Managers on the Move

Dr. GEORGE G. DODD has been named head of the Computer Science Department at General Motors Research Laboratories at Warren, Mich.

Dodd has been a member of the labs for 16 years, most recently as assistant head of the computer Science Department.

He received his B.S. degree in electrical engineering from the University of Kansas at Lawrence and his M.S. and Ph.D. degrees from the University of Illinois at Champaign-Urbana.

George G. Dodd

•••

MARTIN J. SPRINZEN has been promoted director of technical services for Candle Corp. He will be responsible for product development, technical support and internal DP at the Marina del Rey, Calif., headquarters.

Prior to joining Candle, Sprinzen was in charge of the operating system support group at Southern California Edison.

He earned his B.S. degree in electrical engineering from Cooper Union University in New York.

Martin J. Sprinzen

•••

JOY WESSON and JO ANN JOHNSON have been named systems managers for GTE Data Services, a subsidiary of General Telephone & Electronics Corp.

Wesson began her GTE career in 1975 as a systems analyst in Tampa, Fla., and was later made systems supervisor. She will now be responsible for developing and coordinating a productivity management program for the telephone systems group.

A native of Oak Ridge, Tenn., Wesson holds a B.A. in business administration for Georgia State University.

Johnson joined GTE in 1973 from Pratt & Whitney Aircraft Corp. She was named senior analyst prior to her recent appointment. She will be managing a project team that is designing a financial business information system to serve GTE telephone companies.

Johnson, originally form Rockville, Conn., earned a B.A. from The University of Connecticut and an M.B.A. from the University of Tampa.

NCR Corp. has appointed HUGH J. LYNCH assistant vice-president of computer systems at NCR's Columbia, S.C., site. He was general manager of the engineering and manufacturing facility prior to promotion.

Lynch will be responsible for development and manufacturing operations at the Columbia facility, which produces microprocessor-based small computers, terminal controllers and communications products for NCR.

Lynch joined NCR in 1961 as a project leader in on-line software development in San Diego, Calif. He was later promoted to manager of software development and director of engineering.

"NCR's VRX is more transparent than any operating system I have ever seen."

Peter P. Blozis, H.J. Wilson Co., Inc.

PETE BLOZIS:
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LEA EDMUNDS:
"We had good reason to be apprehensive. We were putting in the first V-8585M to be installed anywhere. And, at the same time, we were switching to new operating software, NCR's VRX. We ran parallel for three weeks and never developed a conflict. As it turned out, we could have switched over in a single day."

PETE BLOZIS:
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Peter P. Blozis (right) is Wilson's Vice President, Information Services Division. Lea Edmunds is Technical Services Manager.

* * *

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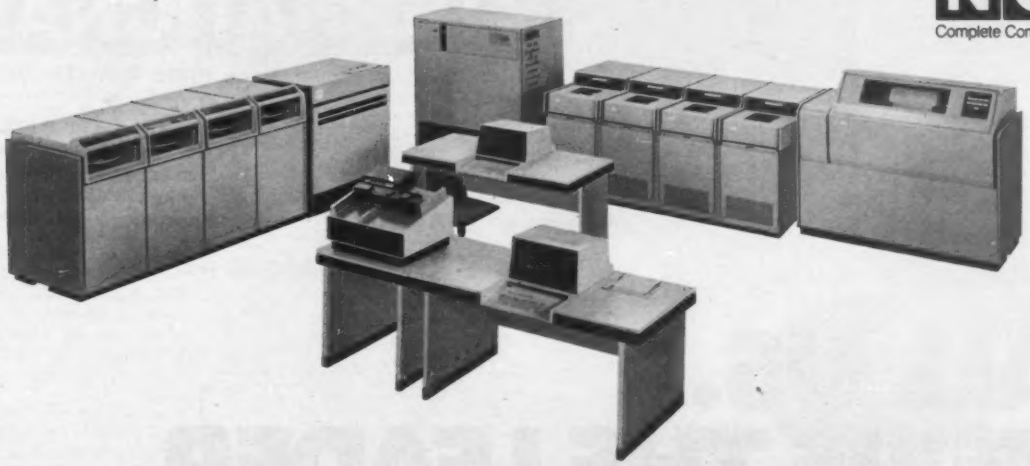

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Four Task Forces

Software Commission Seeking Public Assistance

CW Washington Bureau

WASHINGTON, D.C. — The Commission on Software Issues in the '80s is seeking public assistance for the research efforts of its four newly established task forces.

The commission, a federation of 18 information industry associations, has organized task forces on four issues: education and training of software professionals, software taxation, software standards and software protection.

The software commission said public contributions to the work of the task forces are in keeping with its primary objectives to "identify an industry-wide consensus on the nature of the problems associated with software and to stimulate actions intended to resolve current controversies."

December Deadline

It asked interested parties to submit written comments and materials on any of the four issue areas by Dec. 15.

Because of the nature of its work, the commission said it cannot treat submissions as confidential or proprietary.

The Education and Training of Software Professionals Task Force will seek public comments to define and report on issues and controversies in education and training. The chairman is Tommas Koehler, director of systems development, Montgomery County Public School System, Maryland and a representative of the Association of Educational Data Systems.

The Software Taxation Task Force will study issues of local, state and federal government taxation of software and will research model tax provisions.

Chairman is Jay T. Westermeier, a Washington, D.C., attorney specializing in computer law and a representative of the Data Processing Management Association.

The Software Protection Task Force will study issues affecting proprietary interests in software, including copyright, patent, trade secret and other forms of software protection. The chairman, Michael S. Keplinger, a representative of the Computer Law Association, is chief of the Information and Reference Division, Library of Congress and former assistant director of the Commission on New Technological Uses of Copyrighted Works.

The Standards Task Force will define issues relating to development of standards applicable to software and its use. The group is chaired by Donald Leavitt of the Strayton Corp. Leavitt, former *Computerworld* software editor, represents the Conference on Data Systems Languages to the software commission.

The commission requested submissions to any of the four task forces be sent to its secretary, Steven J. Jost, Commission on Software Issues in the '80s, Suite 116, 1301 20th St., N.W. Washington, D.C. 20036. An additional copy should be sent to the commission's chairman, Daniel T. Brooks, 6106 Lorcom Court, Springfield, Va. 22152.

Seminar to Focus On Acquisitions

LOS ANGELES — A two-day seminar on software acquisition management sponsored by the Education Foundation of the Data Processing Management Association (DPMA) will tour four West Coast locations in November and December.

Jack D. Cooper, president of Anchor Software Management, Ltd. of Alexandria, Va., will present a series of lectures.

The seminars are slated for Seattle, Nov. 3-4; Los Angeles, Nov. 6-7; and San Francisco, Dec. 8-9; San Diego, Dec. 11-12. Registration costs $395 per person, $375 per DPMA member and $330 for members of parties of three or more, government or university personnel. For more information contact EF-DPMA Seminars, Department SAM, Suite 1016, 5959 West Century Blvd., P.O. Box 91295, Los Angeles, Calif. 90009.

Law Institute Slated For Boston Oct. 24

BOSTON — The Northeast Computer Law Institute will be held Oct.24 to provide attorneys with an up-to-date understanding of legal problems that are likely to be encountered in the acquisition and use of a computer system.

Secretary and General Counsel for the Interactive Data Corp. Peter Marx will chair the program, which will span the following areas: acquisition of hardware and software, enforcement of computer users' rights and remedies, procedural problems when using computerized information in trials, the protection of programs and data bases, computer security, crime and audits.

Admission prices vary for this event. Further details can be obtained from Ronald Jordan at the institute's sponsor, Massachusetts Continuing Legal Education-New England Law Institute, Inc., 133 Federal St., Boston, Mass. 02110.

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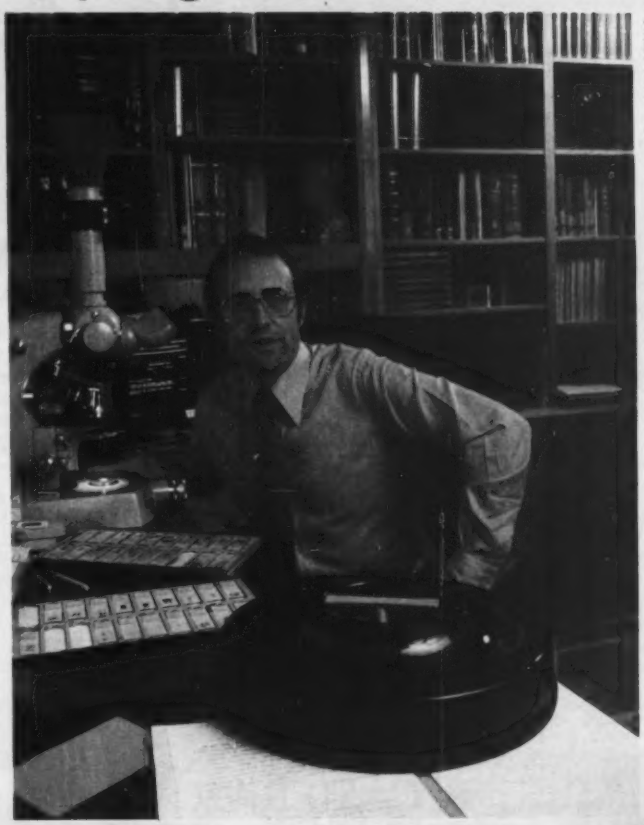

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IP Held Natural Adjunct to Business Planning

By Marcia Blumenthal
CW Staff

NEW YORK — Planning for information processing (IP) systems must be recognized as a natural adjunct to the business plan of a company.

That was the underlying message delivered by three executives who sketched their companies' IP planning techniques at a recent panel at the seventh international Information Management Exposition & Conference (Info 80) here recently.

CW at Info 80

An information system should be viewed no differently than a product, observed Joseph Judenberg, a vice-president of the Chase Manhatten Bank. In the case of IP, that product is answered questions.

Chase Manhatten's planning process is a three-tiered effort.

The tactical plan has a one- to three-year horizon. In this planning environment, planners know what resources and what technologies will be available during the planning period.

The bank's long-range planning, on the other hand, is a four- to seven-year projection and is largely in the realm of assumptions, Judenberg noted. At Chase Manhatten, long-range planning is driven by senior executives who develop the major goals for the organization and disseminate them to the lower managerial levels.

Bridging the gap between these two modes of planning is the strategic planning function, which ties both tactical and long-range planning to the business environment of the bank, Judenberg explained.

One reason management at the institution created a strategic planning function was because major systems at the bank were being "reautomated" — often with no framework in mind.

Ironically, while the need for centralized use of information was becoming more acute among managerial ranks, the bank was giving more autonomy to its various IP operations, Judenberg said.

Strategic Framework

The strategic planning function provides the bank's IP management and user departments a framework for evaluating which systems must be developed to meet the overall goals of the bank. The strategic framework is written out in great detail and used as a planning tool for managers. The framework can be updated as needed.

The flexibility to update a plan is a key feature of the planning method used by the Hartford Insurance Group. This is done religiously every six months, according to David H. Berg, a vice-president with Hartford.

The Hartford's planning process was evolutionary, beginning in 1977. At the time, there was no separate IP planning staff. Nor was there any focus on a "corporatewide response to automation" or the future technology, Berg said. These weaknesses were overcome at the Hartford within the last year or two.

Today, the $4.3 billion insurance company has several IP plans including an overall DP plan that is a three- to five-year applications-oriented strategic plan, a hardware/software plan, a staffing plan and a DP section of the corporate business plan.

The long-range DP plan identifies both internal and external variables the company faces, describes existing systems and looks at the future DP environment.

In analyzing its existing systems, the Hartford identifies four general IP functions — data acquisition and validation, operational support, data storage and management reports. Futhermore, this plan-

(Continued on Page 27)

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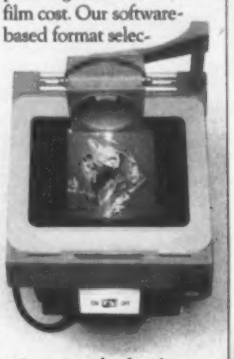

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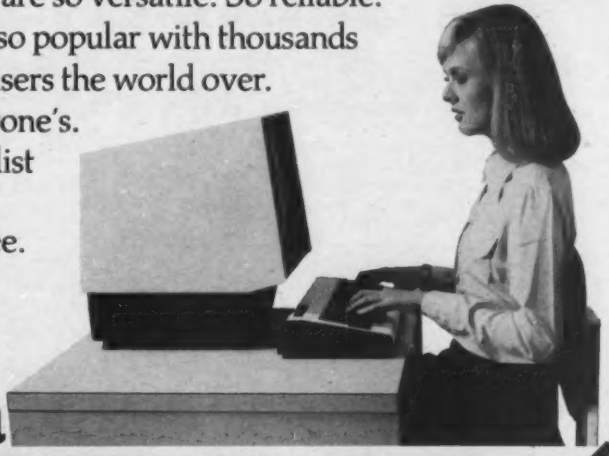

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Corning Glass Combines Automation, Ergonomics To Bolster Productivity

By Bruce Hoard
CW Staff

NEW YORK — After a comprehensive study of the way 800 engineers and secretaries at the Corning Glass Works spend their work time, that company's manufacturing and engineering (M&E) division decided to automate its new building.

Dorothy E. McConnell, operations manager for M&E, said the department is combining automation techniques with ergonomic factors to ensure maximum productivity from Corning workers. She made her remarks at the Information Management Exposition & Conference (Info 80) here last week.

Originally given a charter to decrease M&E budget by 15%, McConnell assembled a unique team of 11 interviewers to spend 2-1/2 hours with each of the 800 employees to find out how they spend their time and what their needs are.

Besides the inordinate amount of time spent on each interview, the process was also unusual in that it had peers interviewing peers. Secretaries were employed to question secretaries and engineers interviewed engineers, McConnell said.

The questionnaire was revised 21 times before it finally satisfied her. It asked people such questions as what they thought they should be doing and what would they do if available work time was cut by one-half.

There was a stated objective with each question, so interviewees would understand the line of questioning. "We needed to monitor the process," McConnell noted. "You get people off on a tangent and it's hard to draw them back in."

Realistic Interpretation

She took a realistic approach to interpreting the results of the survey, which indicated productivity would suffer initially with the installation of automated office equipment. She felt the initial sag would be more than compensated by future gains.

McConnell also insisted that management take the results seriously. Despite the fact top managers disagreed with workers on some issues, she told the executives that the workers' perception of their situations is reality and must be addressed as such.

In order to ease the stress period associated with the change to a new building and an automated ambiance, the manager stressed the need for ergonomic considerations such as skylights and window space.

"If we care about what happens in the workplace, we should also care about the work environment," she stated.

Once the results of the survey are in hand, the best way to impress top management with the usefulness of automation is to introduce a pilot program in a section of the company where employees are overworked and in need of help, McConnell said.

And it is top management that must be impressed if automation is to catch hold. They are primarily concerned with "hard dollar" savings and need visible proof that something new is worthwhile.

D. Patrick Gatton, principal, Gatton, McNally Associates, Inc., concurred with McConnell in her assessment of top management and hard dollars.

"Top management isn't interested in office automation," he said. "Top management is interested in the benefits of office automation."

In describing the future of office automation from the viewpoint of a manager, director or vice-president, he said there are many hurdles that must be cleared. Among them are paper files, inefficient mail distribution systems, in-house print shops, general lack of direction for employees and the lack of measurements for costs and services.

Gatton called on executives to get involved in the push toward automation, saying they must organize their strategies so that line functions meet user needs and staff functions support line functions.

The principal posed several questions to be answered during the transition to automation. Among them: What is the proper rate of evolution toward new systems?

In his estimation, it depends on the nature of the organization. If it has few advanced services, he suggested rapid technological growth. If some automated services are already in place, more controlled growth would be appropriate.

In either case, the decision to upgrade should be made with the knowledge and approval of internal divisions, including labor relations, personnel, DP, legal and others.

CW at Info 80

IP Seen a Must To Business Plan

(Continued from Page 24)

ning takes into account how the systems' functions, such as processing of premiums, and claims and losses operate according to the four IP functions, Berg said.

While the planning process does not result in any quick changes, its implementation has taken steps to integrate the IP systems with the company's overall strategic position.

Although seemingly a much more structured and complex planning system than Hartford's, ITT Courier Terminal Systems, Inc.'s planning method has the same goal — dovetailing systems development with the overall objectives of the company.

A critical element of ITT Courier's IP planning is the identification of basic business processes and the measurement of those processes, according to Barbara Gates, vice-president of administration. Once identified, each process and measurement is further broken down and analyzed.

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Never Say 'We Can't Do That'

Get Used to Change, Data Base Users Advised

By Connie Winkler
CW Staff

NEW YORK — "Change has to become the normal mode of operation" for large data base systems users, according to Harold Uhrbach, a data base management consultant. No longer can users be told, "We can't do that," Uhrbach told about 140 attendees at a session of the Information Management Exposition & Conference (Info 80) here last week.

CW at Info 80

Only by developing this kind of adaptable, changeable, easy-to-understand-and-use information management system will data processing become part of the business, the president of DBD Systems, Inc. of Rockville Center, N.Y., told the session on information resource management.

Uhrbach sees this new information resource management era as a further evolution of data base management systems, which actually date back to 1959.

He explained how to begin establishing an information system that places information as a resource within the company.

First, he said, organizations should define the way in which users are going to get the information they need, or "users' architecture." Then they should define the support components, both hardware and software, and whether there will be a data dictionary.

Uhrbach was enthusiastic about the data dictionary idea, noting the concept has grown from the original idea of a depository for all information about data in the data base. Today the data dictionary has information about the entire environment including where the data is located, what medium it is in, where it is stored and what protocols retrieve it.

Human Interface

The information resource management plan also has to provide for ongoing support which includes data collection and entry, data base design and implementation, he said.

To do all this, Uhrbach recommends a data administration group "to make the human interface happen." This data administration group would support the central data resource, provide project management and control, and coordinate and control the development of systems with shared data resources. All of this, he estimated, takes five to seven years.

"Information top management needs for decision-making is generally not available," the consultant said. "What's more, 80% of the information they require is not really predictable — the form changes or it is external to the organization."

On the office automation front, word processing equipment has been brought into organizations because it is cost justifiable. Now they want to add processing capability to these distributed systems, Uhrbach said.

"If we are going to move into a world where data is going to be available at any location, then we had better get hold of this; we had better manage it," he said.

FCC Chairman To Keynote Meet

LOS ANGELES — Charles D. Ferris, chairman of the Federal Communications Commission (FCC), will be keynote speaker at the Intelcom/80 conference here Nov. 10-14. The event is sponsored by Horizon House.

Bringing together international authorities on telecommunications and computer technology is the goal of the four-day conference and exhibit.

One-site registration for Intelcom's conference program is $200. Admission to exhibits only is $15, and discounts are available to groups of 10 or more.

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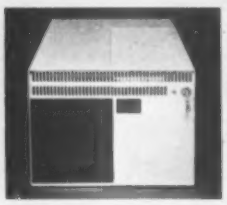

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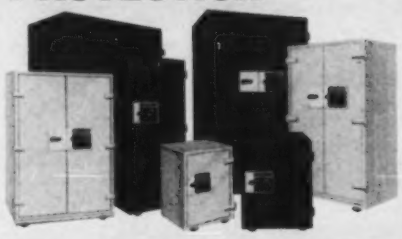

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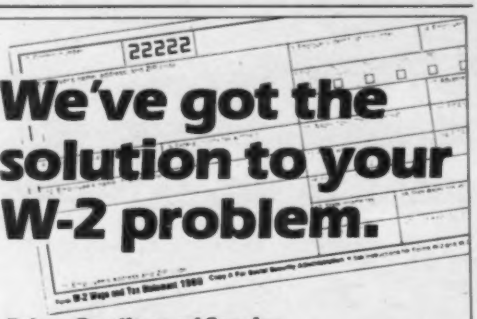

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Planning, Timing Held Key to Successful DDP

By Tom Henkel
CW Staff

NEW YORK — The key to building a successful distributed data processing (DDP) system is to plan your moves very carefully and to try not to do too much too fast.

That was the advice of two representatives of International Data Corp., a Waltham, Mass.-based market research firm and three DDP specialists who recently implemented DDP systems in major firms.

The five panelists spoke at the Information Management Exposition & Conference Info 80 here last week.

Dave Dillman, manager of user information services for IDC, said the firm recently completed a study of both user and vendor attitudes to DDP.

Four Key Areas

Asking various firms in the DDP systems and support business along with users from banking, health care, manufacturing industries and the federal government, IDC identified four key areas to building a successful DDP system. Who decides to build a DDP network, what hardware is purchased and how it is used, how and by whom applications software is developed and education and support for the DDP system are all of vital importance.

Each member of the personnel involved with a DDP system is involved in some part of the decision-making process. Corporate management tends to play a big part in getting a DDP project off the ground, but the management information systems vice-president has a key role in conceptualizing the system and selecting the hardware.

The DP manager is responsible for implementing the system and the DP manager's assistant or liaison is in charge of operations, IDC said.

According to the study, the end user has little responsibility in the decision-making process, but IDC sees that role changing to involve the end user more in operations, Dillman said.

Important DDP Features

Asked what features are important in a DDP system, users said data entry and inquiry/response were tops in importance. Cobol processing was rated low and word processing, storing and forwarding were unrated.

Predicting how DDP systems will develop within the next few years, Dillman said both data entry and inquiry and response features would still top the list. Users will find more use for Cobol processing, making it of medium importance, and store and forward will also become popular, moving up to medium importance.

Word processing will become merely an added feature on DDP equipment, and will not be an important factor, IDC predicted.

Already an important factor — and destined to become an even more important part of the DDP system — are the applications. Each of the DPers who built his own DDP system — Charles A. Lupein, Combustion Engineering, Inc.; William Zilliox, General Electric Corp.; and Frank Korahais, Chemical New York Corp. — all said applications took more time and cost more to develop than originally expected.

Learning by Osmosis

User training appears to be the most neglected factor of DDP development. IDC reported osmosis — or learning from doing — is the most popular form of user education. Some firms have moved one step up from the osmosis method and have employees learn from each other.

More sophisticated shops have developed their own manuals, which are prepared by the DP department and issued to the end users, and others have gone as far as developing formal training sessions for end users, Dillman said.

John Gantz, IDC's director of publications, was chairman of the session.

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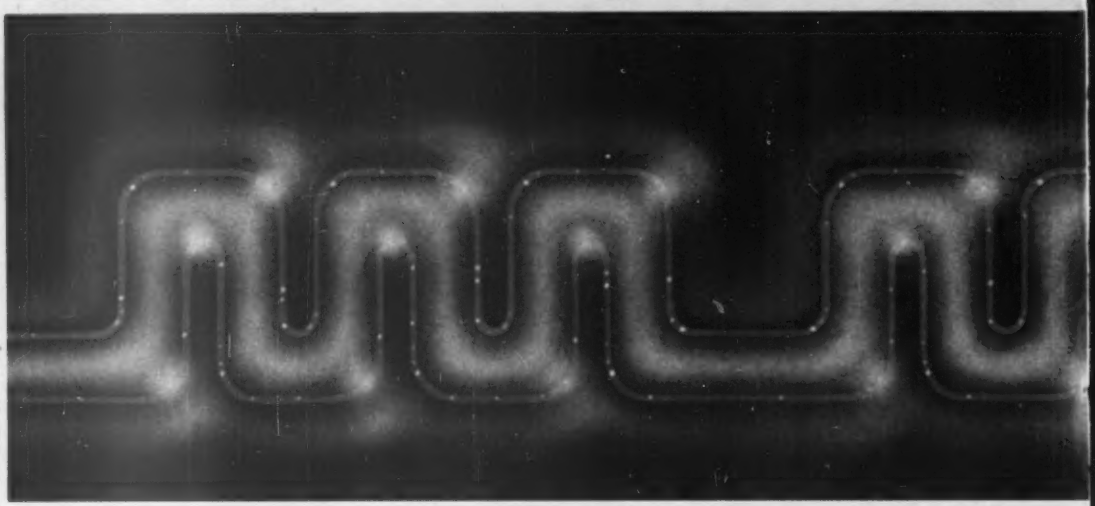


Information management's expanding vistas.

Emphasis on Individual Tasks

Structured Approach to Productivity Advised

By Bruce Hoard
CW Staff

NEW YORK — Productivity is a control systems problem that should be addressed by a structured approach featuring strong emphasis on individual "tasks," according to Alonzo Grace, president of A.G. Grace Co.

Speaking at the Information Management Exposition & Conference (Info 80) here, Grace condemned past efforts at increasing productivity and claimed most organizations have a blurred picture of their internal workings.

The individual to which he referred should be assigned after a careful plan is constructed toward improving productivity, he said. Such a plan must be less simplistic than previous efforts which have sought the easy way out when reaching for internal improvement. "It's time we began looking in the right place," the president said.

That means forming a review committee, architectural team and working group to meet the needs of the workers involved, or "concerned universe," as Grace put it.

The review committee is the key element and must be headed up by a high-level manager from the component of the organization to be improved. That responsibility cannot be delegated to underlings or the effort will be subverted and undermined, he said.

The job of the review committee is to provide careful walk-through and review of architectural designs developed by the architectural team. "It may be composed of the sponsoring manager and zero or more numbers of his staff," Grace said.

The architectural team is charged with constructing a workable productivity plan that is acceptable to both the users and the implementors. While the review committee may have little time to devote to the project, the architectural team works full time on it.

The working group may or may not have any members, the president noted, adding it is responsible for helping the architects develop a cost-effective plan.

A control system typically consists of several elements, including life cycle management, financial controls, product controls and work controls, he said. In the past, several of them have been overstressed.

Of life cycle management, he said, "You never get out a new product if people are calling meetings all over the place."

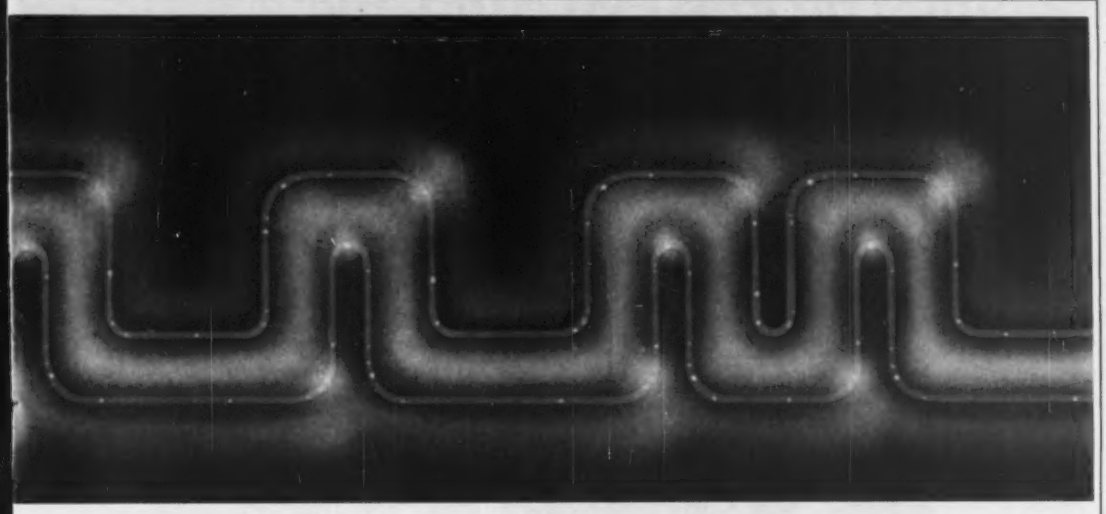
Counterproductive Controls

Financial control can also be overdone, he continued. In fact, if managers do not understand what white-collar people are doing, financial control can almost be counterproductive.

In order to tie the control system to the organization it is supposed to serve, work controls must be applied. These controls, in the form of individual tasks, pinpoint improvement needs and assign them to individual people.

A specific task will appear only once in an overall productivity flow chart, although parts of it may be noted under other tasks, creating a sense of uniformity. "The only real work that gets done is that done by individuals," Grace noted.

CW at Info 80



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Stepped-Up Computer Instruction

Three Universities Tackling Software Challenge

By Tom Henkel
CW Staff

NEW YORK — Despite major hardware advances, software and the programmers to develop it will be the major challenge of the next decade: To meet that challenge, at leat three top U.S. universities are taking drastic steps to make more students familiar with computers, according to Dr. John McCreedie, president of Educom, a Princeton, N.J.-based consortium of information processing talent from about 400 universities.

Speaking recently at the Information Management & Conference (Info 80) here, McCreedie cited figures showing a hundredfold improvement in chip development in the past 10 years. CPU relative performance has jumped by a factor of 10 in the same time frame, McCreedie said, and hardware costs have plummeted — while software costs have skyrocketed.

Viewing those developments in light of a decreasing labor force, the information processing industry will be even harder hit by a programmer shortage in the next few years, he indicated.

At a session chaired by *Datamation* Editor John Kirkley, McCreedie noted that many high schools are buying microcomputers and offering courses in programming languages. However, while many potential programmers are starting earlier, they may also be starting off by learning the wrong programming techniques, he added.

Ambitious Plan

Pittsburgh's Carnegie-Mellon University (CMU), ranked by some as one of the top three computer science departments in the country, may have the most ambitious plan for getting would-be programmers on the right track. The school has vowed that within five years, every freshman — including business, arts and humanities students — will be issued a microcomputer as part of the university's orientation package.

Each microcomputer will be able to access the school's network of eight Digital Equipment Corp. VAX-11/70 and Decsystem-20 computer systems from virtually any location.

CMU eventually hopes to build the microcomputer for every student concept into an interactive graphics system accessible from campuswide intelligent terminals, McCreedie said.

The groundwork is already set for the CMU system. The university has already switched to an all-DEC system, with each distributed part sharing a common operating system. This, McCreedie said, allows any student to access various computer systems, programmed for different applications, without a tremendous amount of programming expertise.

CW at Info 80

Stanford University wants to develop its campuswide computer system along similar lines, but the school is taking a more conservative approach. Stanford is starting off by putting terminals in its top administrators' offices and gradually expanding the system to serve more and more people — both students and administrators.

Stanford already has installed terminals in about 30 top administrators' offices, McCreedie added.

Harvard University commissioned the Arthur D. Little Co. (ADL) to analyze what it should do to improve computing skills.

The ADL report recommended the school spend an estimated $10 million to revamp its computer system — basically along the lines of the CMU and Stanford systems, McCreedie said.

The unusual part about the three schools' system development plans is the same basic plan seems to be the answer for three very diverse schools.

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Computers Viewed Helping Blind Into Schools

By Nancy French
CW Staff

TOKYO — Although blind children are just as intelligent as those who can see, they don't have the same chance of going to college.

Nor does being unable to sign his name on a rental application or a check do anything for a blind person's sense of self-esteem.

Both of these handicaps can be eased with help from computers, according to two papers prepared for the International Federation for Information Processing's (Ifip) Congress 80 here last week.

Integrating blind students into the school in his home town rather than a specialized school for the blind is the educational solution for most blind children, according to Germany's Waltraud Schweikhardt, whose paper described a microcomputer-based system that allows a public school teacher to prepare braille materials automatically on an everyday computer terminal keyboard.

This computer-based Learning and Working Environment for the Blind (LWEB) sponsored by the Deutsche Forschungsgemeinschaft at the University of Stuttgart is based on a portable IBM 5110 that usually works as a stand-alone machine, he said.

Peripheral devices such as displays and printers have been adapted to the special demands of the handicapped at the LWEB. The standard keyboard is recommended for use in preparing the alphanumerical documents. It is technologically more feasible since braille cannot be retranslated uniquely, and it is more economical, since sighted students can use the terminals, too, he said.

As for graphics, a device called an optacon is used. This device contains a miniature camera, which moves across the front of the display. The image under the lens is simultaneously reproduced on a tactile array by miniature vibrating rods, he said.

For peripheral storage, Schweikhardt recommended floppy disks because of short access time and easy handling. For a device that produces tactile hard copies, the experiment used a braille display (BD) 64, which operates at 9,600 bit/sec.

Here drawings are plotted on an IBM 5130 printer and copied off-line by an optical to tactile converter, which gives a tactile output, he said.

A wide variety of educational software is already available for these systems, particularly in mathematics.

Handwriting Instruction

As for teaching handwriting, Ian D.G. MacLeod from the Australian National University in Canberra, described a system based on a Digital Equipment Corp. PDP-11/34. It involves loudspeakers, a graphics display, a console terminal, light pen and a wrist cuff along with basic peripherals.

Blind students learned to form the letters in groups according to their method of construction, and digits were learned as a group, the paper said. Students learned how to keep their pen on the correct path and on target with feedback from the loudspeakers and with vibrations from eight small vibrators mounted in the wrist cuff.

A key feature in the system was the capability to calculate how much the writer would overshoot the intended character-forming area and left-to-right path. This enabled the system to minimize response delay.

The paper showed vast improvement for two trainees — one who had been blind since five years of age, and another, since birth.

The computer-aided system is better than existing methods in several key respects, MacLeod indicated. First, it breaks complex tasks into relative simple steps, where tracking operations are not confused by preceding or succeeding strokes. Trainees receive immediate and continuous feedback, whether or not their performance is satisfactory, and if not, why not.

After practicing on this machine, trainees advanced to paper and pencil and continued to improve, although both write slowly without guides.

This method of tactile and auditory stimulation could be used to teach other motor skills to trainees with perceptual and cognitive handicaps as well as visual ones, MacLeod predicted.

CW at Ifip 80

'Belle' Carries Bell Researchers To Chess Victory

LINZ, Austria, — At the sixth attempt, a program that took two computer science researchers from Bell Laboratories more than eight years to develop won the World Computer Chess Championships here.

Ken Thompson and Joe Condon, whose program runs on a Digital Equipment Corp. LSI-11 microcomputer with additional home-built hardware, won five games and a tiebraker to take the 1980 title.

Although computer chess is becoming big business with over $100 million spent each year, according to Thompson, this competition was for the experts. "No one ever comes up out of the blue to win," said Thompson, who was expecting to do well this year.

The competition is sponsored by the International Computer Chess Association,. which has about 400 members, and the human chess association Fide.

The program written by the New Jersey pair, called Belle, beat entries from Queen Mary College in London, McGill University in Montreal, Duke University in North Carolina and Northwestern University, before taking on and defeating a program developed by the University of Michigan in the final.

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Human-Machine Relations Addressed

CAD/CAM Held Too Complex for Engineers

By Nancy French
CW Staff

TOKYO — Today's computer-aided design/computer-aided manufacturing (CAD/CAM) systems are so complex that many engineers don't want to take the trouble to learn to use them, according to Jakob Vliestra of Philips Gloeilampenfabrieken, the Dutch electronics and appliance firm.

As an example, Vliestra cited his own corporation where only about 2,000 out of 19,000 engineers use computers in their work. "The others don't want to take the time to learn the complex language needed to use them, only to get their jobs kicked back because of language [not engineering] errors," he explained.

He was setting the stage for a panel discussion on human-machine relations in computer-aided design here at the International Federation for Information Processing's (Ifip) Congress 80 last week.

Future Systems

What should the relationship between the user and the machine be? What is the future for these systems?

Vliestra believes the secret to better, easier to operate systems involves greater use of a variety of input methods, such as voice and pattern recognition, accompanied by more sophisticated editing capabilities. This way, the engineer can work and think like an engineer rather than an information processor.

After the engineer does his mental work and his drawings, Vliestra said, let the machine extract from the drawing the information needed for further processing.

For instance, a very large-scale integration designer has a mental picture of how he's going to design something — he knows how he's going to pick up his registers, and he knows what kind of gates he wants to use. The work is very high-level and abstract, Vliestra explained.

With better input devices, he could draw all this in his office and then present the drawing to a reading device. Only then would the dialog between the engineer and the computer begin. Then, perhaps through voice recognition or simple editing commands, the engineer can correct how the computer has interpreted his work.

In support of this type of thinking, Ernest Warman, with Perkins Engines, the British diesel engine manufacturer, pointed out how easy communication could be, using as an example the scene at a microcomputer hobby show. "A young school boy, with no knowledge of how a computer works, can begin playing micro-based board games immediately, merely interacting with the computer in everyday language," he said.

Jose Encarnacao, of the Technische Hochschule in the Federal Republic of Germany, disagreed with the simplification idea, saying engineers should be happy to learn the necessary languages if the payback is high enough.

CW at Ifip 80

Instead, panelist Encarnacao suggested that greater emphasis be placed on more and better models and what tools are needed to tune the systems so they work better.

One attendee observed that the marketplace would force systems to improve. "Systems and languages that are too complex will die because no one will use them," he said.

Warman indicated that the future of CAD/CAM would depend in part on what systems were being used for. A system for a fabric designer should have the capability of generating color and texture. Perhaps the designer of a seat should be able to create the feel of a seat.

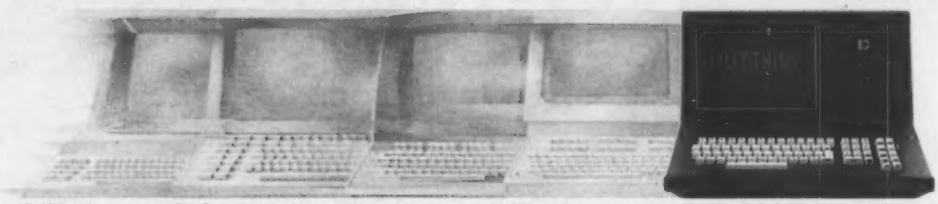
Situation feedback should be built into a system, Warman said, adding "there's no reason why you couldn't clamp headsets on a designer and get his [mental] inputs into the system."

Tandem Users Elect Board of Directors

SAN DIEGO — Delegates at the third annual international Tandem Users Group (TUG) conference elected Dr. David Mishelevich of the University of Texas Health Services Center to head the users organization for the next year. Mishelevich was one of the original founders of TUG.

The 1980 board of directors also welcomes its new vice-president, Bob Strand of the Hocomco in Des Plaines, Ill.; symposia director Ellen Van Landingham of Commodity News Service in Kansas City; secretary/treasurer Nancy Trankle from Tandem Computers, Inc.; newsletter editor Dick Ward from Network Concepts in New Jersey; directors-at-large Bill Braithwaite of the University of Colorado, Denver; and Marilyn Page of Dash-Data in New Jersey.

The TUG meeting was held Sept. 14-17 and offered two dozen workshops along with special interest group sessions.



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Accelerating Education

Computer Seen as Pencil in Child's Learning

By Nancy French
CW Staff

TOKYO — Children can learn to write at the same time they learn to speak.

That's the view of Seymour Papert, an MIT professor. Speaking on the first day of the International Federation for Information Processing's (Ifip) Congress 80, Papert said he based his theory on the work of Jean Piaget, who demonstrated that children learn remarkably complex concepts — like conservation of number, for example — without actually being taught.

A child learns almost everything he knows from his environment, and if a computer designed to allow a child to manipulate pictures and objects were a part of that environment, he could learn to read and write almost by himself, Papert said.

Education could be vastly accelerated, Papert maintained, if children learned, through computer-based play, that mathematics is easy, and that they are not impotent — rather, they are powerful. His paper described an experiment in Dallas where a nursery school teacher wrote a number of programs that enabled three- and four-year-olds to manipulate brightly colored objects on a computer screen by hitting a small number of special keys marked with arrows to indicate directions of movement and colors to indicate color change.

The children loved these games, he said, but soon learned that the teacher was playing a more complex game by typing more detailed instructions into the keyboard. Soon they asked to learn this game. "Very soon the children were pecking their way about the whole keyboard, spelling out the logo commands that would interrupt one game and set up the next. They were on their way toward two new worlds of intellectual endeavor: writing and programming," he said.

Self-Confidence

Children's self-confidence is eroded by being dependent and infantile for so many years. This condition impedes learning, eventually creating the "learning problems" that beset almost all children in school, Papert said.

With a foundation of self-confidence in mathematics and awareness of basic concepts, children could easily learn more complex tasks — such as programming — that more and more people will need to know in the future.

The computer becomes the equivalent of a pencil for such youngsters.

Papert did not go into detail about how the ability to use the colored and directionally marked keyboard was actually translated into writing logo commands in the Dallas experiment or whether the children learned English or logo first.

Papert cautioned that such preschool learning could have the most tremendously positive effects on the learning ability of future generations, but at the same time destroy what we consider to be most human. "It is easy to fantasize a scenario in which it gives rise to an epidemic of psychoses," he admitted.

CW at Ifip 80

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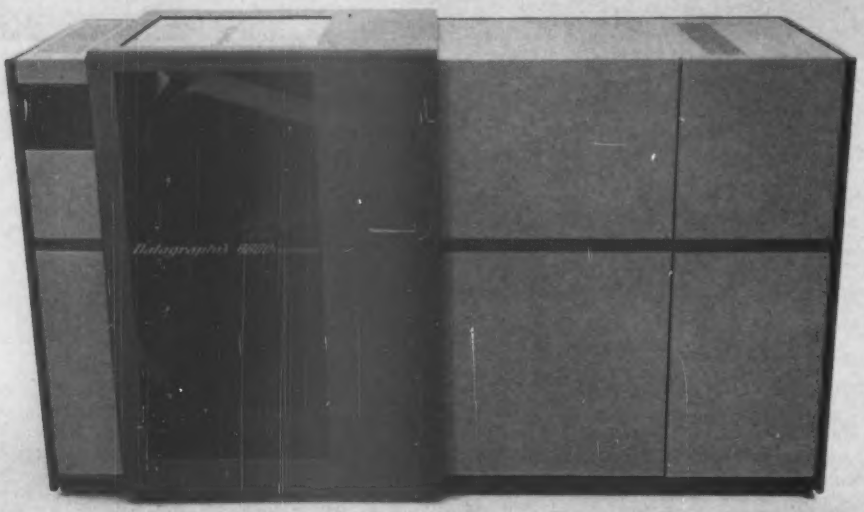

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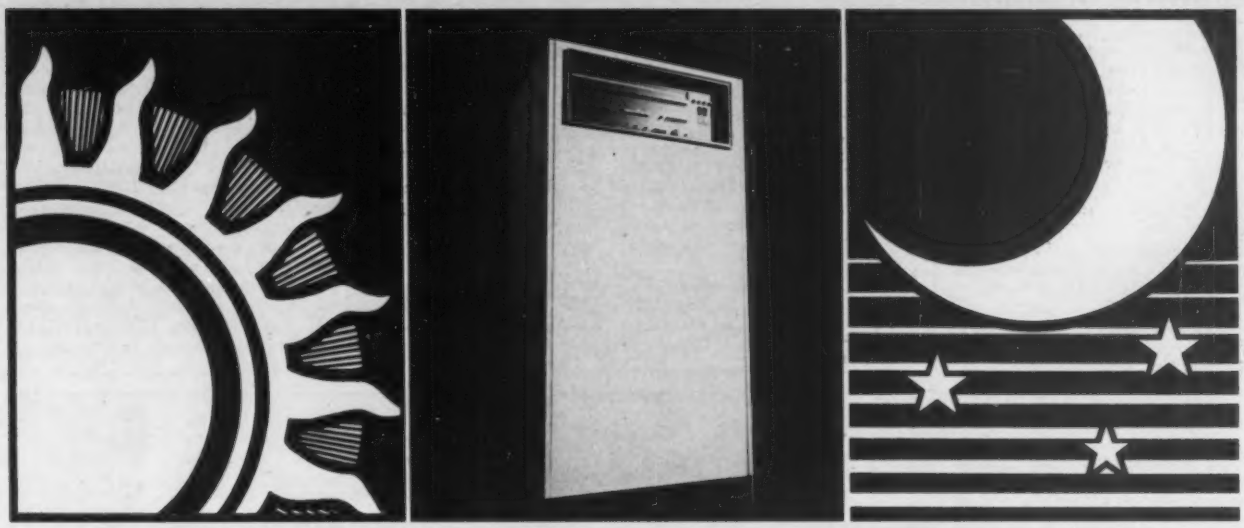

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Info/MFG Set To Highlight Manufacturing

CHICAGO — The first Information Management Exposition & Conference for Manufacturing Companies (Info/-MFG) will address 12 major aspects of manufacturing when it is held here Nov. 18-20, according to its sponsor, Clapp & Poliak, Inc.

The areas to be discussed are materials management, manufacturing planning and control, closed-loop manufacturing systems, financial systems, marketing systems, purchasing systems, engineering systems, office automation, human resources, advances in manufacturing information systems, material-handling systems and plant engineering systems.

Daniel T. Carroll, president and chief executive of Hoover Universal, Inc., will deliver the keynote address, "Strategies of Productivity."

The exhibition at Info/MFG will emphasize equipment, programming and software. Among the exhibits will be computers and peripherals, programming tools, word processing equipment, telephones and communications gear, dictation equipment for the plant and office, records storage and retrieval systems, copying and duplicating machines and electronic mail, in-house typesetting and graphics systems.

The fee for the full, four-day conference and show registration is $295. The two-day conference and show charge is $110 and the half-day package costs $60. For the exhibition only, there is a $10 charge without a ticket and a $5 charge with ticket, Clapp & Poliak said from 245 Park Ave., New York, N.Y. 10167.

Computer/Law Issues Spotlight Crime

LOS ANGELES — The *Computer/-Law Journal* has published the first issue of a two-issue set on computer crimes with a foreward by Sen. Abraham Ribicoff (D-Conn.).

The issues contain articles by Donn Parker, Susan Nycum, John Taber and Rob Kling and are edited by Jay Becker, director of the National Center for Computer Crime Data. Part 2 documents case studies, federal and state statutes and bills addressing computer crimes.

The set costs $16 per issue and can be ordered from the Center for Computer/Law, 10th floor, 530 W. Sixth St., Los Angeles, Calif. 90802.

Cpeug 80 to Open Monday

ORLANDO, Fla. — Computer performance evaluation (CPE) in an era of smaller, cheaper hardware and improved digital communications will be the topic of the 16th meeting of the Computer Performance Evaluation Users Group (Cpeug 80) when it opens here next Monday.

Sponsored by the National Bureau of Standards and the Department of Commerce, the four-day event will feature a preconference workshop running concurrently with a preconference tutorial.

The workshop topic will be "Performance Prediction for Large Software Systems," led by Dr. James Browne and Dr. K.M. Chandy of Information Research Associates. "CPE — Concepts, Definitions and Techniques" will be taught by Donald R. Deese of the Federal CPE and Simulation Center.

The keynote speaker, Rowland G. Freeman III, administrator of the General Services Administration, will deliver a speech entitled "Toward a More Efficient ADP Procurement Process in the '80s."

The technical program for this year's conference emphasizes new technology areas, procurement issues in the '80s and new approaches in traditional CPE areas.

Six relatively new areas will be covered in this year's program: data base management system performance, software improvements, human interfaces, security, fraud and audit.

Other areas to be discussed include data communications, computer network performance, performance prediction techniques and capacity planning. A highlight of the program will be a panel discussion on "Federal ADP Procurement," chaired by Tom Giammo of Fedism.

The conference fee is $70, payable at the door since the preconference registration deadline is past. More information is available from Ted Gonter, publicity chairman, General Accounting Office, 441 G St. N.W., Washington, D.C. 20548.

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SAN DIEGO — Two consecutive conferences, "Profitability and Productivity in the '80s" (Oct. 19-22) and "New Electronic Media — Convergence and Diversity" (Oct. 22-24), will be held at the Hotel Del Coronado here.

The first conference is sponsored by International Data Corp. (IDC) and the second by its subsidiary, Link Resources Corp. of New York, both market research and management consulting firms.

The "Profitability and Productivity" conference was designed to provide an overview of the productivity problem, noting specific developments in technology, as well as hardware and software products and services aimed at systems application enhancement. What users want in productivity aids and what the vendor community now has and will have to offer will be discussed.

Specific topics to be addressed include executive stress and fitness, technology's impact on information systems productivity, managing information resources for greater productivity and hard vs. soft productivity.

One of the conference's three keynote speakers, Ira Gottfried, will speak on Tuesday on "Motivating MIS People in the 1980s." Also that day, Dr. Werner L. Frank, executive vice-president of Informatics, Inc., will speak on "The New EDP Economics: People/Software Trade-Offs."

The "New Electronic Media" conference is intended to teach users to relate to new electronic information developments and also how to capitalize on current business products and markets by using the new electronic media as distribution channels or to enhance the user's product line.

Designed to inform equipment manufacturers, systems operators, information providers, service companies and users, the conference will include presentations, panel and open discussions, demonstrations and guest speakers.

The afternoon of Oct. 22 will feature demonstrations of representative systems and the information they currently offer or are poised to launch. Demonstrations will include video disks, on-line data bases and personal computers.

The Friday morning session, entitled "Transmedia Analysis," will study the interrelationships among various types of information and the new electronic media.

Registrants may attend either conference for $350 or the week-long IDC-Link fall conference for $750. For additional full-week registrations, the fee is $495/person. More information is available from Christine Donovan, vice-president of marketing and operations at Link, 215 Park Ave. South, New York, N.Y. 10003.

Phoenix Confab On Productivity Opens Feb. 23

PHOENIX — "Improving Productivity Through Performance Management" is the theme of the 1981 DP Performance Management Conference sponsored by Applied Computer Research and Performance Management Associates. The event is slated to take place here Feb. 23-26.

The areas to be addressed at the conference will include measuring DP productivity, productivity in development, management of change, pricing DP services, fulfilling user service objectives, the role of planning in performance management, problem resolution and using performance management to improve DP productivity.

The audience will be comprised largely of top DP managers, and the atmosphere of the conference will be more interactive than most conventional meetings of this kind, the sponsors said.

Registration is $350 per person, which includes breakfasts, lunches, one dinner, cocktail receptions and all handout material. Further details are available from Jim Christensen at Applied Computer Research, Suite 3, 3003 W. Northern, Phoenix, Ariz. 85021.

Seminar on Data Base Set for Three Cities

SEATTLE — "Data Base Management, Administration and Control: An Approach for the 1980s" is a two-day seminar being offered in the Battelle Seminars and Studies Program. The course will be conducted here Oct. 27-28, in Boston Dec. 15-16 and in Houston Jan. 19-20.

The seminar was designed for information center managers, administrators, designers and systems analysts.

It will be directed by Ronald B. Batman, a manager of system design at Univac.

Attendance is limited, and enrollment is $495, which includes course materials and coffee breaks. More details are available from Renate Lammermann at Battelle Seminars and Studies Program, 4000 N.E. 41st St., Seattle, Wash. 98105.

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The prices for the display terminal start at $1,295 for the character transmission model, and $1,495 for the block model. Volume procurements can save you up to twenty percent for either configuration of the terminal. Prices and current schedules subject to change.

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Nov. 9-11, Danvers, Mass. — **Automated Office of Tomorrow.** Contact: Institute for Graphic Communications, Inc., 375 Commonwealth Ave., Boston, Mass. 02115.

Nov. 9-11, Washington, D.C. — **Politics, Payments, Pricing & Productivity.** Contact: Electronic Money Council, Suite 215, 1775 K St. N.W., Washington, D.C. 20006.

Nov. 9-13, Charleston, N.C. — **Computer Related Crime: Training Workshop for Prevention, Detection, Investigation and Prosecution,** sponsored by the U.S. Dept. of Justice. Contact: Koba Associates, Inc., 2000 Florida Ave., N.W., Washington, D.C. 20009.

Nov. 10, San Juan, Puerto Rico. — **The Minicomputer Hardware/Software Decision.** Contact: Brian F. Crynes, Price Waterhouse & Co., 1251 Ave. of the Americas, New York, N.Y. 10020.

Nov. 10-12, New York — **Advanced DP Management: Methods and Techniques in the 80's.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 10-12, Winston Salem, N.C. — **How to Make Manufacturing Systems Happen,** co-sponsored by M.W.L., Inc. and Arista Education & Consultanting, Inc. Contact: M.W.L., Inc., Suite 254, 3655 Thousand Oaks Blvd., Westlake Village, Calif. 91361.

Nov. 10-12, Honolulu — **Computer Controls.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121. Also being held Nov. 17-19 in St. Louis.

Nov. 10-12, New York — **Word Processing: Effective Operations Management.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in New York.

Nov. 10-12, New York— **Managing the Word Processing Function.** Contact: Media Systems Corp., Management Systems, 757 Third Ave., New York, N.Y. 10017.

Nov. 10-12, San Francisco — **Word Processing Supervision Workshop.** Contact: the National Institute for Management Research, P.O. Box 3727, Santa Monica, Calif. 90403.

Nov. 10-12, San Francisco — **Data Base Management Systems: General Concepts & Planning Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 17-19 in Washington, D.C.

Nov. 10-12, San Francisco — **Data Processing: an Introduction to Concepts and Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 10-12, Rio de Janeiro, Brazil — **Structured Programming and Software Engineering.** Contact: Long & Associates, Inc., 820 Tioga Ave., Bethlehem, Pa. 18018.

Nov. 10-12, Chicago — **DP Operations Today: Effective Scheduling and Console Operation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 10-12, Washington, D.C. — **Data Communications: Effective Network Design.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in Houston.

Nov. 10-13, Orlando, Fla. — **Data Entry Management Conference.** Contact: Data Entry Management Association, P.O. Box 3231, Stamford, Conn. 06905.

Nov. 10-13, Houston — **Basic Project Management: Planning, Scheduling and Control.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 10-13, Los Angeles — **International Telecommunication and Computer Exposition.** Contact: Horizon House International, 610 Washington St., Dedham, Mass. 02026.

Nov. 10-13, Philadelphia — **Senior Project Management.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 10-14, Houston — **IMS/VS Data Base Design.** Contact: Data Base Management, Inc., 281 Hartford Turnpike, Vernon, Conn. 06066.

Nov. 10-14, Boston — **Improving Office Productivity: Analysis & Design Techniques for Manual Systems.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 10-14, Atlanta — **Structured Systems Analysis and Design.** Contact: American Management Associations, 135 W. 50 St., New York, N.Y. 10020.

Nov. 10-14, Honolulu, Hawaii — **Productivity Through the DP Revolution.** Contact: Technology Transfer Institute, P.O. Box 49256, Los Angeles, Calif. 90049.

Nov. 11-12, Andover, Mass. — **Managing 'Performance' Breakthroughs.** Contact: University of Lowell, Continuing Education, One University Ave., Lowell, Mass. 01854.

Nov. 11-12, Rosemont, Ill. — **Manufacturing Productivity Solutions Conference.** Contact: Society of Manufacturing Engineers, 1 SME Drive, P.O. Box 930, Dearborn, Mich. 48128.

Nov. 11-13, Toronto — **Canadian Computer Show & Conference.** Contact: Canadian Information Processing Society, 243 College St., Toronto, Ontario M5T 2YI, Canada.

Nov. 11-13, Dayton, Ohio — **NCR Educational Users Conference.** Contact: Jim Davies, Evangel College, Springfield, Mo. 65802.

Nov. 11-13, St. Charles, Ill. — **Manufacturing Planning & Control.** Contact: Arthur Andersen & Co., Center for Professional Education, 1405 N. Fifth Ave., St. Charles, Ill. 60174.

Nov. 11-13, Dallas — **Man & Computers: Partners in Manufacturing.** Contact: Computer Aided Manufacturing-International, Inc., Suite 1107, 611 Ryan Plaza Drive, Arlington, Tx. 76011.

Nov. 11-13, Los Angeles — **Interactive Computer Graphics.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 11-14, San Francisco — **Pacific 80 Distributed Processing,** sponsored by the Association of Computing Machinery, Inc., Contact: Dr. Robin Williams, Manager, Database & Distributed Systems, IBM K55-282, 5600

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Structured Programming Workshop. Yourdon offers a Structured Programming Workshop and a Structured Programming Workshop in COBOL. Each teaches a broad range of techniques and skills for practical use by programmers.

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Cottle Road, San Jose, Calif. 95193.

Nov. 11-14, Dallas — **CICS/VS Application Design.** Contact: On Line Software International, 65 Route 4 E., River Edge, N.J. 07661.

Nov. 11-14, San Francisco — **Computer Network Design & Protocols.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 11-14, Boston — **Programming in Ada.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 11-14, Sunnyvale, Calif. — **Hands-On Pascal Workshop.** Contact: Integrated Computer Systems, 3304 Pico Blvd., P.O. Box 5339, Santa Monica, Calif. 90405.

Nov. 11-Dec. 2, Summit, N.J. — **IMS/DLI.** Contact: Advanced Training Center, Chubb Institute, 480 Morris Ave., Summit, N.J. 07901.

Nov. 12, Los Angeles — **Advanced APL Programming Techniques.** Contact: STSC, Inc., 11 Clearbrook Road, Elmsford, N.Y. 10523. Also being held Nov. 24 in London.

Nov. 12-13, Toronto — **Introduction to APL.** Contact: Numetrix Ltd., Suite 600, 3 Church St., Toronto, Ont. M5E 1M2, Canada. Also being held Nov. 25-26 in New York.

Nov. 12-14, Arlington, Texas — **Data Communications Networks.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181.

Nov. 12-14, New York — **Introduction to Micro Personal Computers: Application, Selection and Usage Guidelines.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Washington, D.C. — **CICS/VS Command Level Programming.** Contact: Data Base Management, Inc., 281 Hartford Tnpk., Vernon, Conn. 06066.

Nov. 12-14, Wellesley, Mass. — **On-Line Systems Design.** Contact: Q.E.D. Information Sciences, Inc., 180 Linden St., P.O. Box 181, Wellesley, Mass. 02181. Also being held Nov. 24-26 in Philadelphia.

Nov. 12-14, San Francisco — **Integration of Word Processing and DP Systems.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075. Also being held Nov. 19-21 in Washington, D.C.

Nov. 12-14, Amsterdam — **Facsimile in Tomorrow's Organization.** Contact: Institute for Graphic Communications, Inc., 375 Commonwealth Ave., Floor 4, Boston, Mass. 02115.

Nov. 12-14, Washington, D.C. — **Minicomputer Systems: Guidelines for Successful Selection, Acquisition and Operation.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Washington, D.C. — **Office Automation Systems.** Contact: Institute for Professional Education, Suite 303, 1515 N. Court House Road, Arlington, Va. 22201.

Nov. 12-14, Philadelphia — **Business & Personal Computer Sales Expo '81.** Contact: George Pachter, Produx, Inc., S.W. corner of Roosevelt Blvd. and Mascher St., Philadelphia, Pa. 19120.

Nov. 12-14, Washington, D.C. — **Auditing Data Base Systems.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Nov. 12-14, Denver — **Introduction to Word Processing: Concepts, Systems and Application.** Contact: Datapro Research Corp., 1805 Underwood Blvd., Delran, N.J. 08075.

Nov. 12-14, Washington, D.C. — **Office Automation Systems & Methods.** Contact: Management Resources International, Inc., 6621 Electronic Drive, Springfield, Va. 22151.

Nov. 13-14, Raleigh, N.C. — **SAS Statistics Course.** Contact: SAS Institute, Inc., P.O. Box 8000, Cary, N.C. 27511.

Nov. 13-14, Boston — **Software Engineering.** Contact: Data Processing Management Association Education Foundation, 5959 W. Century Blvd., Los Angeles, Calif. 90045.

Nov. 13-14, Washington, D.C. — **Electronic Mail.** Contact: George Washington University, Continuing Engineering Education, Washington, D.C. 20052.

Nov. 16-19, New Orleans — **National Conference on Automated Teller Machines.** Contact: Bank Administration Institute, P.O. Box 500, 303 S. Northwest Highway, Park Ridge, Ill. 60068.

Nov. 16-19, Morgantown, W. Va. — **User Services Conference,** sponsored by Association of Computing Machinery. Contact: Rita Seplowitz, Information Services WVNET, 837 Chestnut Ridge Road, Morgantown, W. Va. 26505.

Nov. 17-18, New York — **Successful Selection of Minicomputers.** Contact: RHY Consultants, Inc., P.O. Box 21026, St. Paul, Minn. 55121.

Nov. 17-18, Washington, D.C. — **How to Manage Data & Information as a Resource.** Contact: Arnold Barnett, Barnett Data Systems, 19 Orchard Way, N. Rockville, Md. 20854.

Nov. 17-18, Cambridge, Mass. — **Word Processing: Concepts and Guidelines.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Nov. 17-18, Atlanta — **EDP Project Management.** Contact: Harvard University, Laboratory for Computer Graphics, 48 Quincy St., Cambridge, Mass. 02138.

Nov. 17-19, New York — **Auditing the Systems Development Life Cycle.** Contact: Frost & Sullivan, Inc., 106 Fulton St., New York, N.Y. 10038.

Nov. 17-19, Houston — **DP Disaster Recovery Workshop.** Contact: EDP Security, Inc., 400-2 Totten Pond Road, Waltham, Mass. 02154.

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Automated Taxi Dispatch System Sends Cab to Caller in 30 Seconds

MONTREAL – A computer program said to be the first of its kind may be about to put an end to one of the psychologically abrasive aspects of urban life – the seemingly interminable and often futile wait for a taxicab.

A computerized taxi dispatch system, developed by Association Taxi LaSalle here, can send a LaSalle cab on its way to a caller in 30 seconds or less. The system handles about 15 million calls per year – more than eight times the population of the entire city, the company said.

The program, developed by the staff of the association in cooperation with outside program specialists, runs on the company's Honeywell, Inc. Level 62 small business computer. Prior to its implementation, LaSalle's operations in Montreal often approached the chaotic, according to Gerard Brunet, head of Brunet LaSalle Corp., with which the Association is affiliated. "With thousands of streets, hundreds of taxi stands, 1,200 taxicabs to control and administer, manual controls were becoming increasingly inefficient," he recalled.

How It Works

Here is how the computerized system works. At Taxi LaSalle operational headquarters there are eight workstations, each with a telephone board of 120 lines and a Honeywell VIP CRT terminal. The stations are also equipped with radio transmitting systems and connected via telephone lines to the Level 62, which is located in the heart of Montreal's financial district, several blocks from Taxi LaSalle.

When a customer calls LaSalle, the call is registered on one of the eight screens. The computer verifies the zone and address and sends the information to the dispatcher assigned to the area from which the call originated.

The driver of the first taxi at the stand identifies himself at this point by pressing his microphone button – he need not say anything.

By merely pressing his microphone button, his taxi number appears on the terminal screen at the headquarters workstation and is automatically recorded on paper and sent to the computer.

The computer instantly verifies this taxi number – to determine whether the owner of the taxi is in "active" standing. If verified, the dispatcher gives the driver the customer's pick-up address.

All this is accomplished in less than 30 seconds. The old manual process took as much as an hour, particularly during the rush hours.

Other Features

The computer program stores all the streets, individual street addresses and public buildings' addresses of Montreal, and a zoning system divides the city into numbered zones. With this system, no taxi can be sent to a nonexistent address, saving the driver from making useless trips.

For special occasions like conventions, sports events, concerts and the like, the number of taxicabs required can be estimated in advance.

From an administrative point of view, the system provides communications capabilities with all 1,200 taxis at the same time. Thus it is known which or how many cabs have worked at what time of the day or night.

Permanent records are made available for review and, most importantly, training time is drastically reduced by about 90% of the time it used to take when the old manual method was used.

Brunet says that under the old system the dispatchers were the only ones who knew all of Montreal's zones, streets and buildings and which taxis served which areas. A sick dispatcher was a cause for alarm.

"But with the Honeywell Level 62 system we can do today what we only dreamed of in the old days. It is a modern miracle," he said.

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† Includes one original set and two duplicate sets.

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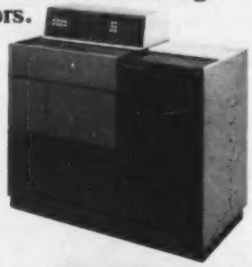

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EDITORIAL

Rise to the Challenges

The productivity crisis that confounds Corporate America provides a golden opportunity for DP and MIS managers.

Clearly, top management is looking to MIS and DP managers for answers — not just assistance, but factual answers and strategies. One answer, in the words of Robert Price, president of Control Data Corp., "is knowledge, not just information. Computer-aided knowledge must be in the business lexicon."

The productivity crisis represents a change for MIS and DP managers to move to the head of the corporate class. Computers are increasingly recognized as the best game in town for improving productivity, and more and more MIS and DP managers are being asked to provide leadership in resolving productivity problems.

MIS and DP managers face two challenges. One lies within their own departments. The task there is to manage the staggering changes in technology and its proliferation throughout the corporation. Computers are sprouting up everywhere, and the internal challenge is to control and coordinate their spread, while merging them with the emerging technologies of telecommunications and office automation.

Other internal challenges demand attention: shortages of qualified personnel, snowballing demands for applications development from end users and increased competition from nontechnical management for control of corporate information resources.

Monolithic centralization is not the answer to these problems; nor is the uncontrolled proliferation of technology throughout the corporate structure. One answer, in the words of Ted Withington, Arthur D. Little consultant, may lie in the centralization of MIS control with the decentralization of applications development.

The second challenge comes from top management. MIS and DP managers can expect increased pressure for more quantifiable results, better performance of present systems and increasingly flexible systems to meet the changing conditions of the marketplace.

If MIS and DP managers are to be held accountable for providing these things, they in turn should expect management to provide the tools to produce them.

DATA PAST

Five Years Ago
Oct. 22, 1975

BOSTON — The number of jobs for clerks and unskilled workers would decline faster in New England than in the U.S. as a whole by 1980, largely because of increasing automation in the area, according to a report published by the Department of Labor. But while the report predicted a grim job market for clerical workers here, it forecast a healthy growth in opportunities for computer programmers, analysts, operators and other DP specialists.

— — —

MINNEAPOLIS — Under a proposed agreement, Honeywell, Inc. would handle all contacts with Xerox computer customers and provide continuing marketing, sales and maintenance support to Xerox computer users. In a joint statement, the firms said the arrangement would become effective Jan. 1.

Eight Years Ago
Oct. 18, 1972

NEW YORK — The value of computerized voter registration lists was proven here as errors were corrected in tens of thousands of records. A candidate for local election had charged that thousands of voters would become disfranchised, since they had received erroneous notices, telling them to go to polling places that would not have their names.

— — —

NEW ORLEANS — The Federal Bureau of Investigation regulation that law enforcement computers had to be dedicated to that application was more a "power play" than a security consideration, computer experts and criminologists agreed here. The FBI required that access to its Computerized Criminal History file be through computers operated and managed by criminal justice agencies.

LETTERS

Outraged by Power Grab

I am outraged by the "raw" power grab by Brotherhead of Railway and Airline Clerks (Brac) to force unionization of DP professionals [CW, Sept. 15]; forced unionization is the most obnoxious form of tyranny. I have no objections to individuals choosing to form a bargaining unit and then affiliating with a larger union, but the reverse can not be condoned.

Closed shops, dues checkoff and so forth are other tools of these power-hungry organizations which do not trust or have the support of their so-called members. Such organizations should not be tolerated in a "free" society, and I certainly do not want to see them increase their power by "stealing" the power of DP professionals. I call for a concerted effort by all DP professionals and their organizations (where are you when we need you?) to stop this process *now*.

I think it would be appropriate to get all current candidates for Congress to firmly and clearly state their position on this issue and for us to vote accordingly. Also let us use our own lobbying power to eliminate this threat. Finally, I think our professional organizations should file in support of the DPers protesting this action. If we do not stand together now . . .

Leo Winck-Myers
Mill Valley, Calif.

How About Ramis II?

While fully appreciative of the variety of report generators available and the need to choose a representative sample, I feel the exclusion of Mathematica, Inc.'s Ramis II data management and reporting system precluded a complete survey as it excells in many categories listed in the chart [CW, Sept. 29].

As a proficient user of Pansophic Systems, Inc.'s Easytrieve, I have repeatedly chosen Ramis II over Easytrieve for a multitude of reasons. I believe Ramis II report-generation capability makes it a formidable rival of any selected for comparison. Ease of using the free-format report language has allowed even non-DP personnel to quite successfully develop dozens of parameter-driven reports.

The simplicity of the language, coupled with the capability to directly access IMS, Total and Vsam as easily as it does Qsam attests to the fact that it merits consideration as a representative package.

Christopher J. Finegan
Meriden, Conn.

Excellent Issue

I just finished reading *Computerworld Extra*. It answered "everything you ever wanted to know about data base management but were afraid to ask."

I was enthralled when I finally had my hands on a periodical I had been looking for. *Computerworld Extra* was excellent.

Douglas N. Gabel
Collegeville, Pa.

Nobody Is Neutral

Several years ago, after many heated pro- and anti- IBM letters, CW published a letter of mine. Immediately thereafter, readers returned to their jobs rather than to their typewriters. Perhaps it is time to rehash my idea/-letter.

Many newspapers and magazines publish regional editions. I suggest that CW publish two editions: one pro-IBM, the other con. Subscribers and advertisers could choose between the two. There would be no need for a neutral IBM issue because, in the intervening years since my original letter, I *still* have not met anyone who is neutral on IBM!

D.C. Stultz
Satellite Beach, Fla.

SOFTLINE/Werner L. Frank

The IBM Software Line

How does the IBM Data Processing Division (DPD) represent its software line and what does IBM reveal about its future software plans? To achieve some insight, we examine the public document reflecting the DPD offering, "Keyword Index and Program Information," which has recently been reissued in the form of a 13th edition (publication reference number is GB21-9949-13).

First we note a shift in coverage. In the 12th edition, reflecting information announced through Sept. 30, 1977, the compendium title was modified by the delimiter "System/370." This restriction is conspicuously absent in the title of the new edition dated June 1979, which reflects product announcements as of March 31, 1979.

A second difference worth noting is the inclusion of a "new" category of covered programs. In the 13th edition, system control programming (SCP) is added to the prior edition's contents which included program products, field-developed programs, installed user programs and programming RPQs.

The most noteworthy difference in the two successive editions is the increased size of the catalog from 146 pages to 377 pages. Software is getting to be more and more important at IBM!

The product count, inclusive of the SCP, rose from 783 to 1,080, or an increase of 38%. The growth in listed programs is predominantly in the application software area. Ignoring the SCP, the increase in application software and systems software is 34% and 19% respectively.

And there is a first to be recognized. IBM has gone one step beyond simply marketing *nom de plume* software under the neutral term "installed user program." The catalog points out that the computer-aided design software, Cadam, is actually a registered trademark of Lockheed Corp.

Expanded Presentation

But this increase in number of pages is not only the result of more available products. The bulk of the new pages are devoted to expanding the presentation itself.

In the older catalog, two sections were provided. The first one was the Keyword Index, consisting of 91 pages. The second section of 47 pages listed the programs according to the classification scheme shown in Figure 1.

In the current catalog, a new indexing scheme has been introduced, replacing the eight category codes by 45 "cluster index" titles. Programs are, therefore, now listed according to their affinity for one or more of these cluster titles. Section two of the 12th edition has now become two new sections in the 13th edition — a listing of programs by cluster (86 pages) and a numeric listing of programs by their program identification number in 47 pages.

The cluster index reveals the new direction and emphasis of the catalog. Fourteen of the indexes are directly related to applications, 12 of which are specific to individual industries. One of these, Distributed Office Systems, is specified but no products are yet included. The application clusters and

(Continued on Page 48)

CATEGORY CODE	CATEGORY NAME	NUMBER OF ENTRIES
1	Generalized Applications	168
2	Industry Applications	192
3	Industry Systems Support	27
4	Systems Support	89
5	Productivity Aids	114
6	DB/DC	65
7	Conversion Aids	32
8	Languages/Sorts/Utilities	96

Figure 1

INDEX TITLE FOR APPLICATIONS	NUMBER OF LISTED PROGRAMS
Cross Industry	128
Scientific & Engineering	16
Distribution	56
Education	14
Finance	101
Health	33
Insurance	11
Manufacturing	71
Media	5
Process	13
State, Local Government	9
Transportation	24
Utility	4

Figure 2

HUMAN CONNECTION/Jack Stone

How's Your Internal Communications Program?

While I was preaching the gospel on effective writing at a seminar on human communications for DPers, a student interrupted the proceedings with this rather devasting question: "Granting that it's very nice to learn these personal skills, what happens in my case where the communications within the DP organization are so bad that they minimize my opportunities to apply these new skills?"

I decided to avoid a direct answer and successfully did so by taking up a discussion of what constitutes an effective management communications program. It turned out that the students seemed interested in my views on this subject, so I decided to summarize them here.

An effective management communications program is one that not only informs the staff of matters of importance to the business and provides a channel for the staff to speak up, but also encourages the staff to understand and accept the organization. The program is intended to build a sense of pride and accomplishment within the staff and to encourage the staff to identify with the goals and programs of the information systems department. General information disseminated in the program could include the following:

- The goals, objectives and general operating plans of the department in the context of the broader goals of the business.
- The functions, responsibilities and interdepartmental relationships of each organizational unit within the department.
- The accomplishments that are expected from the staff by management.
- Factors used in measuring individual performance.
- Individualized career plans, which combine job assignments, training and education to expand staff capabilities.
- A statement of how management communicates with personnel to keep them informed and to listen to their suggestions and ideas.
- Support facilities, services and information systems to aid the staff in performing their assignments.

The program can be further described in terms of documentation that could be developed. Here are some examples:

1. Organization Manual. This is a formal reference document which contains official information on the department. Sections might include:

- Mission, goals and objectives.
- Organization and reporting relationships.
- Functional statements of operating units: summary and detail.
- Position descriptions: summary and detail.
- Personnel policies.
- Career plan models.
- Support services.
- Information systems.

2. Operations Handbook. This document provides general information about the information systems department in an easy-to-read, easy-to-understand style. Basic information from the organization manual is extracted, rewritten and supplemented with related subjects. Sections might include:

- Letters from the director.
- Department philosophy.
- History of accomplishments.
- Organization.
- Management.
- Responsibility, authority and interrelationships.
- Operating plans and programs.
- Personnel plans and programs.
- Support services.
- Information systems.

3. Personnel Plans and Programs. This is a package of forms and procedures to aid supervisors and managers in the development of comprehensive plans and programs for each member of the staff. In addition, several model packages are included to illustrate how they would appear when completed. The packages might include:

- Functional statement: summary and detailed.
- Objectives for coming period.
- Criteria for performance measurement.
- Performance evaluation.
- Career plan.
- Training/education plan.

4. Staff Meetings. These forms are intended to improve the effectiveness of the staff meetings. They are designed to focus on organization performance (as measured by accomplishments vs. projection), identification of major problem areas, assignment of responsibilities to correct the problems and reporting on progress toward resolution. Topics include:

- Short- and long-range objectives.
- Operating plans.
  - Tasks.
  - Schedules.
  - Milestones.
- Progress reports.
- Problem areas.
  - Problem statement.
  - Background.
  - Alternate solutions.
  - Recommendations.
- Organization announcements.
- Personnel actions.

5. Special Communications. This group of projects might include the following:

- Regular letters from the information systems director on progress toward meeting goals.
- Bulletin board announcements.
- General meetings of all personnel.
- Social and recreational events.

THE TAYLOR REPORT/Alan Taylor

IBM Contract Method Conceals 'Fine Print'

IBM claims that its contracts' fine print is easy to read — but does so while planning to conceal from buyers the contents and even whereabouts of the fine print.

The "easy-to-read" claim appears in large print at the top of a contract outline in a recent advertisement. The form is supposed to be signed by the buyer and sent in.

The equipment concerned is not described in the outline, but IBM offers information via an 800 telephone number, and it provides a reference to some other unidentified documents, called "IBM's official published specifications."

It would have taken all of 10 words to identify the publication number of the specifications, but IBM doesn't give it. This means that a buyer might never see the specs, although they form the only contractual definition of the goods.

IBM does not suggest that a buyer might like to know, when he is speaking to that 800 number, whether the facts given him are really reliable — or whether facts half-claimed in the advertisement are reliable enough for the company to stand behind them.

The "facts" in the ad are all given as questions. For instance, IBM suggests that prospects ask, "Is this the most economical display ever offered by IBM?" This is something for which, if claimed and not true, I would excpect IBM to take full responsibility.

Trick Clause?

What IBM does say is that in the terms it will send *after* accepting the pig-in-a-poke order, there will be "Limitation of Remedies and other General Provisions." I wonder if these include a clause preventing reliance on the advertisement or on 800 information. Certainly there is some more hidden fine print that is not easy to read, although that not-so-easy fine print may permit IBM to disown its own claims. Buyers should know before they sign up.

The trick here is that, by some neat maneuvering in the published outline, the potential buyer is made to feel that he has seen the fine print when he hasn't. The *real* IBM fine print isn't even sent until it's too late! Under this setup, it is the buyer who offers to accept, sight unseen, IBM's terms if IBM will accept his order.

IBM only permits the buyer to get out of the acceptance if he claims — accurately, in writing and within 10 days — that a change in the outline's uninformative terms or in the prices has occurred. If IBM, for instance, has made it a condition that nothing it says in the advertisement or on that 800 line is to be binding, that would not be a "change" but simply a condition in the fine print that wasn't made available to the buyer! So that wouldn't entitle the buyer to reject the new fine print!

No Performance Specs

There are a number of other reasons this particular contract method is not good. The published fine print does say that IBM will provide some warranty services for three months to keep the equipment in "good working order." But it doesn't define what that means. (In one contract I praised recently, LFE promised 98% uptime, but no figure at all appears in the IBM document.)

Nor does the form indicate where the units and their contents are made. They are cheap; but if that means spares have to come from the Far East, the bold print should explain that and provide some idea of future costs. (LFE gave a five-year control on maintenance costs. Does IBM give anything in the "easy-to-read" fine print?)

Contract rights are only as important as the remedies are effective. IBM doesn't tell what the warranty or other rights are, or what limitations it has placed in the fine print on a buyer's rights to recover if the contract is broken. That again is something the buyer finds out after he has been hooked.

But it would not have taken much room to set these rather important things out. The references to the undisclosed "full terms" use some 140 words, including more than 100 words of repetition. In fact, with rewording and asterisk references, there would be more than enough room to include most of the real fine print.

All in all, this is the worst claim I have ever seen any computer company make. To pretend that the fine print is easy to read when it isn't even made available to the buyer until after the contract is in force, and to make an advertising point of it, isn't overselling. It is just covering a con game.

A company that would make such a claim deserves suspicion, rather than respect, when it speaks about fine print, computers or carcinogens.

IBM is at least showing some sensitivity about its customers' fear of fine print. That, at least, is a slight step forward. But now let's give the customer a fair deal in the fine print.

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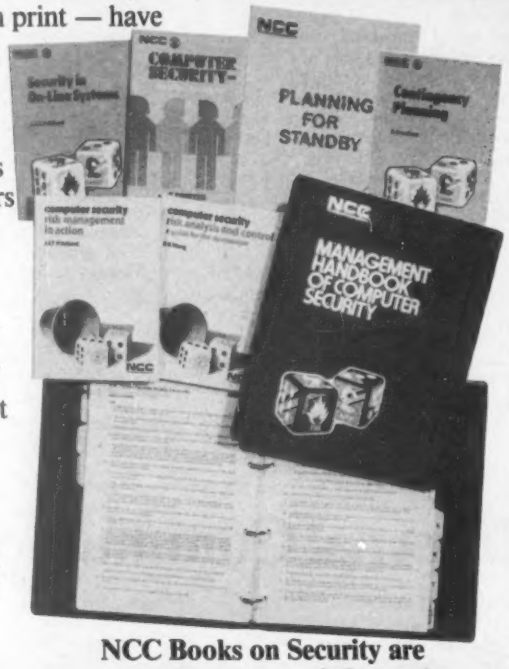

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Need changes in an existing document? With the 5520, your secretary can make changes, additions and deletions in a fraction of the time retyping would take.

And in addition to word processing functions, the 5520 does arithmetic functions and has files processing capabilities, too.

The 5520 even files documents on diskettes. So you can retrieve them in no time at all.

Which not only saves you time, it saves you space. And makes it easy for you to make inserts from one document to another.

What's more, the 5520 is compatible with other IBM systems. It can interchange information with other 5520's and a wide range of IBM office products (including the new IBM Displaywriter) and appropriately programmed System/370 computers. Which means it can help you enhance the capabilities of other IBM office products you may already be using.

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H.G. Wells' time machine was a fantasy. IBM's is a fact.

IBM
General Systems Division

The IBM Software Line

(Continued from Page 45)

associated product listings are shown in Figure 2.

The remaining index titles cover the usual utility and systems programming categories supporting the operating systems, languages and peripherals. Hardware-specific programs are listed for the 3790, 8100 and 4300 series in addition to the implied software for the 370 and 30 series.

Program prices vary from a few for which there is no charge to those with a perpetual license fee ranging from less than $100 to more than $1,000 per month. A number of programs are available for a one-time installation fee and many are obtainable for a monthly fee which becomes a paid-up license after 12 or 24 such payments have been made.

The catalog prices between successive editions show a remarkable stability. A spot check shows most prices remaining the same, although a few were moderately increased and some even decreased.

Generally speaking, IBM program product prices remained constant during the '70s. However, there are notable exceptions as, for example, with cirtical software such as CICS and IMS. The VS versions of these systems have had price changes three or four times for a total increase of approximately 35% over a seven-year period.

But it is not the price of a single product that determines the expenditure. Rather, it is the growing family of products and their interdependency that leads to increasing commitment to IBM software.

Thus the IMS data base and data communications shop will probably have as a minimum software rental:

IMS/VS Data Base	$950
IMS/VS Data Communications	$1,150
Cobol Compiler	$236
Application Development Facility	$550

Price and product availability are, of course, dynamic. Periodic information is provided through IBM announcements of product changes and new releases. This information is made available through direct information mailers, the *Monthly DPD Support Bulletin*, inserts to the *IBM Consultants Manual* and the special distribution for software houses through the Software Information Exchange Program. There are often 10 to 20 such announcements per month.

As an example of recent events, some 50 cataloged products were withdrawn the beginning of 1980. Effective April 1, 1980, price increases of 10% were announced for roughly half of the products and all of the SCP monthly support charges.

Implications for Sales

It is, of course, interesting to speculate on the annual sales of IBM from the software represented in the catalog. Excluding the presently available free SCP, the balance of the software, renting at an assumed average of $300 per month and with six packages per installation, would yield revenues of more than $400 million for the 20,000 worldwide installations represented by the DPD family of computers.

As already noted above, this edition introduces the listing for SCP. There are 89 such line items introduced in the catalog, none having, at the moment, an associated charge. Nevertheless, the SCP products are listed, all set and ready to become part of the fee structure, if and when. And using the same assumptions as already stated for the non-SCP products, IBM could readily double it annual sales in software.

What is the "book" value of this software? We take a clue from Series/I software pricing, where IBM permits one-time purchase as well as monthly leasing. Such software typically has a 60-to-1 ratio in price. Hence, five years of monthly payments are roughly equal to the purchase value of a software product by a single user.

Assuming that the ratio of unit purchase price to original development cost is the often-used commercial marketplace ratio of 1 to 25, then the ascribable value of all IBM software, including the SCP, would be close to $500 million. However, given the special situation of market dominance by IBM, it is more likely that the operative ratio of unit cost to development is the more favorable 1 to 50, in which case the listed software would carry a marketplace value of up to $1 billion.

At the time IBM unbundled hardware and software in 1968, the subsequent pricing suggested that the software component of the total monthly rental of hardware and software was a paltry 3%. Today, the software component is readily 10% to 20%, and for the newer systems, such as the 4300 series, it can easily go to more than 50%.

Software is big business at IBM and it's getting bigger.

Frank is executive vice-president of Informatics, Inc. in Woodland Hills, Calif.

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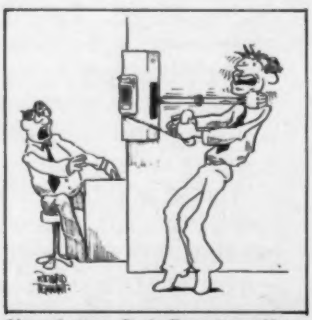

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The question then becomes what is right for your environment. Again, STC is ready to help you find the answer. And since we offer the best of both, we won't promote one at the expense of the other.

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By adding main memory with STC's 3700 Universal Memory System, you will experience an immediate improvement in both throughput and terminal response time. This is true because as your real-to-virtual storage ratio increases, paging activity declines, with a consequent reduction in channel and disk resource contention. Thus each incremental megabyte means faster execution and a higher level of multi-programming; in short, greater productivity. Up to a point that is, for there are some significant bottlenecks which memory cannot resolve.

Over-initiation is a case in point. As you add batch jobs or log-on more TSO or CMS users, the increased job load will eventually result in page thrashing and resource conflict. That threshold can be reached long before your CPU is 100% busy.

As illustrated in the graph, a high-speed paging device, such as STC's 4305 Solid State Disk, will dramatically broaden your system's performance range by decreasing its sensitivity to over-initiation. Faster page response time raises your paging threshold while dedicated paging storage reduces contention on your disk subsystems.

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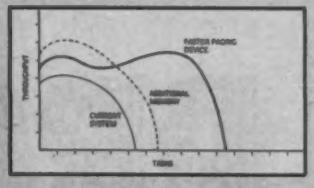

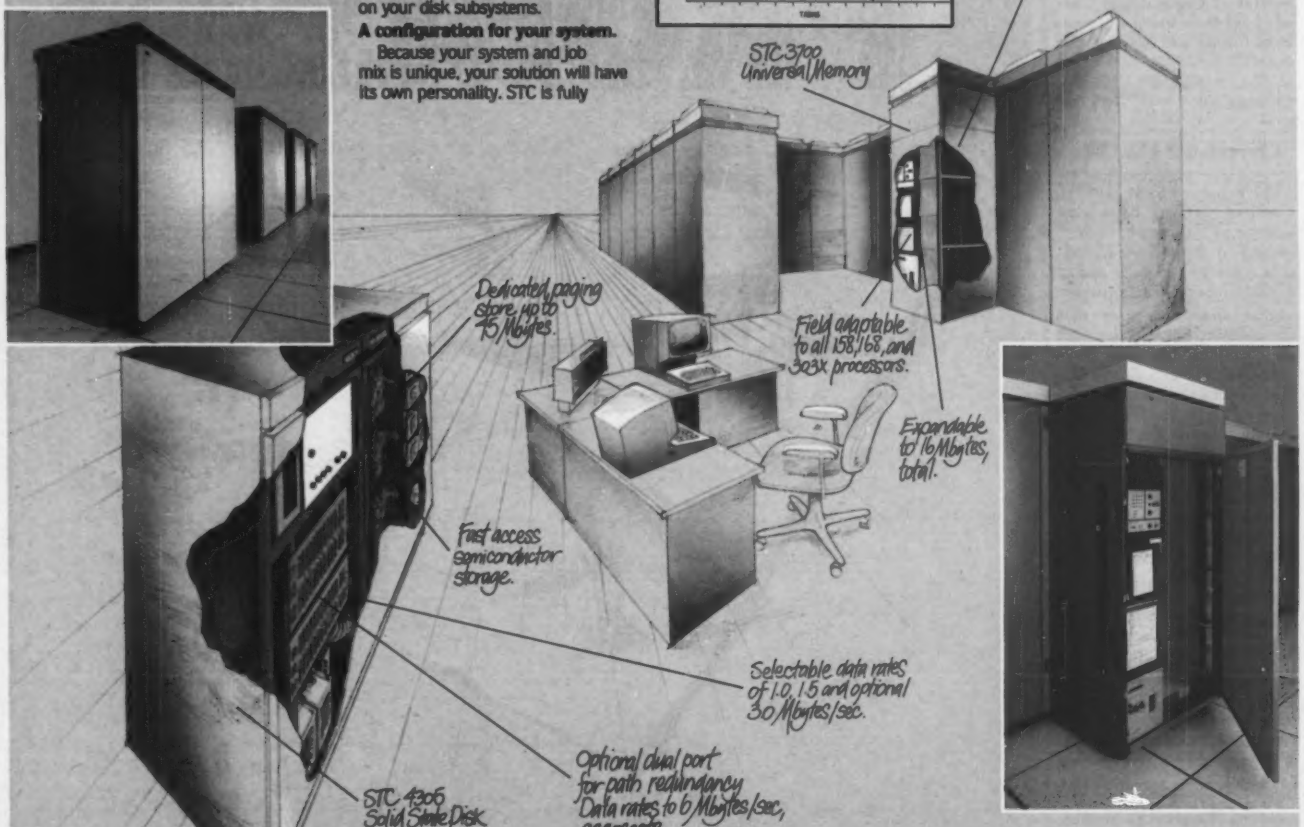

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LETTERS

Zip Suggestion

The article on the nine-digit Zip Code in the Sept. 15 issue listed the implications to existing computer programs in making the change from five digits. Has the Postal Service considered getting the greater Zip resolution it needs, but without patron trauma, by remaining at five positions and changing to alphanumeric?

The present Zip provides 10^5 = 100,000 possibilities, not enough considering that much smaller countries such as Italy and Israel also need five digits. But five alphanumerics would provide 36^5 = 60,466,176 possibilities. Granted, not all of them would be usable — certain four-letter words in Zip codes would be Not Nice; but there would be more than enough Zip resolution left to meet all postal requirements.

Changing to five alphanumerics would only require minimal program changes, mainly to editing parameters. No changes at all would be needed for preprinted forms.

Proof that this proposal is workable: England and Canada have been using alphanumeric Zip successfully for years.

Rudolph E. Hirsch
Chicago, Ill.

Overstated His Case

The author of "Put It in the Contract" [CW, Sept. 15] overstated his case, both with respect to the software products industry generally and to the software contract process.

Most observers agree that the industry got its start with the "unbundling" of IBM software in 1969. Since that time — only 11 years — the industry has taken off, promising to surpass the hardware industry in this decade.

Like any growing, dynamic industry, software products has had and will continue to have its share of failures. However, the industry has had more than an ample share of successes as well.

Analysis of the record reveals that well over half of software companies now belonging to the Association of Data Processing Service Organizations, Inc. (Adapso) have been in existence for 10 years or more. These companies have not only survived but have prospered in a highly competitive market because of a commitment to innovation and the superior quality of their products and services.

Similarly, the author overstated his case with regard to the allocation of risks between vendor and user. No business could survive long if it did not in some way limit its liabilities; moreover, unlimited liability would certainly result in significantly higher costs to the user. The best contract is a fair contract — one that equitably allocates risk, liability and responsibility between both parties. Anything less is just bad business.

Ronald J. Palenski
Attorney
Adapso
Arlington, Va.

'How-Tos' Helpful

I was thoroughly impressed with William Harding's "Bottom-Up Documentation Best Bet" [CW, Sept. 15]. It is a pleasure to see a straightforward, step-by-step description of how to document a virtually undocumented system.

Articles such as this are a great help to us analysts who are continually faced with cleaning up old, well-worn systems. They are also very helpful when trying to determine what an old system did so the new one being developed will not leave out any necessary functions.

I most heartily encourage *Computerworld* to continue articles that are "how-to"-oriented.

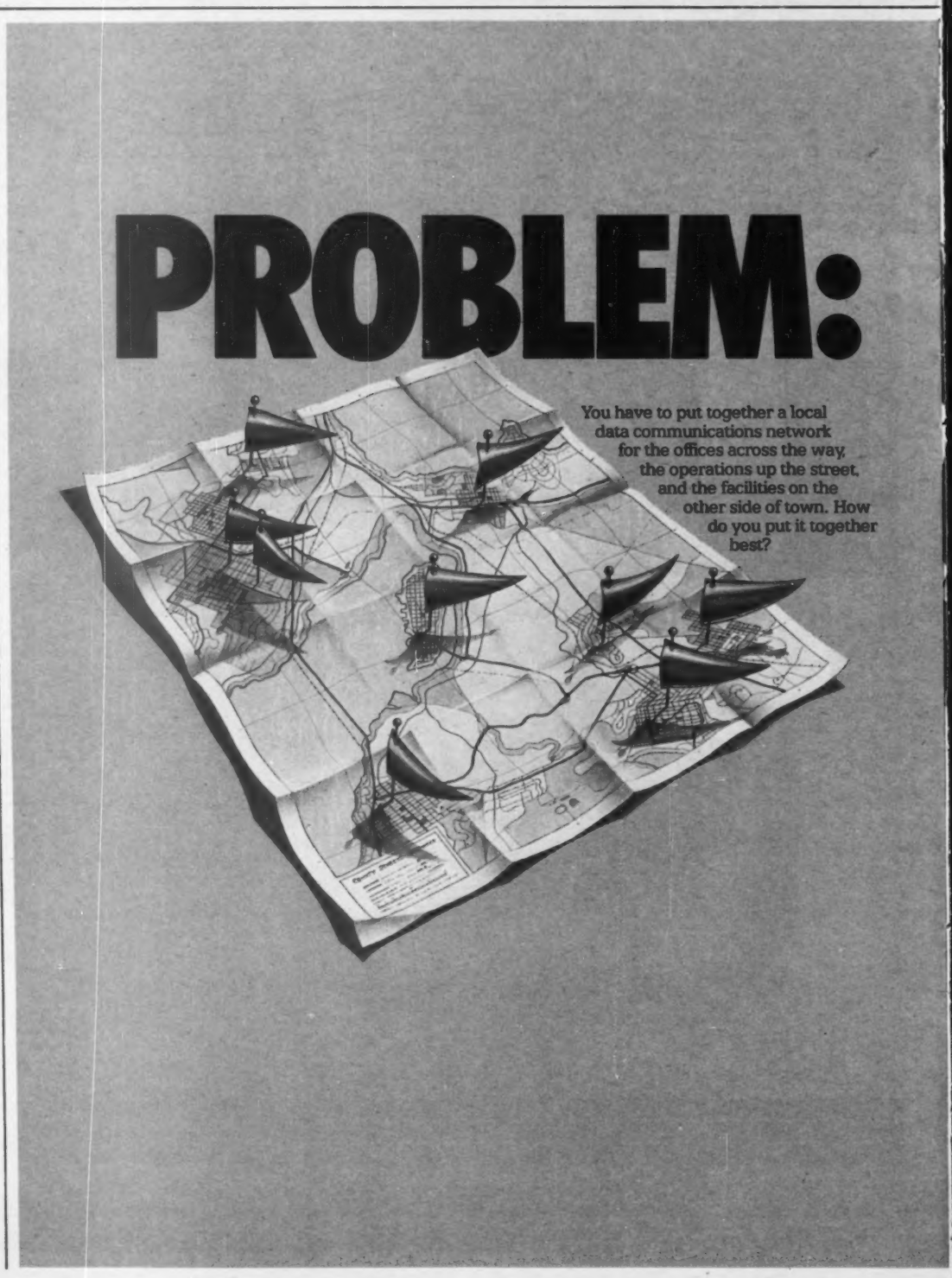
Annelise Pedersen
Palo Alto, Calif.

Writer Blighted

Jack Stone was so right in his Sept. 22 column to ridicule Sherwin Pakin; to highlight the obvious typos in this man's letter; and to use "verbal stilettos" to shred this man's statements. After all, how *dare* this man — who, as I read it, makes his living as a DP software writer — tell the *infallible* Stone that he *might* be wrong.

In his opening remarks, Stone said, "I have been blasted." But reading Pakin's letter, sandwiched between Stone's scathing remarks, I would say that it's Pakin who has been blighted.

J. Van Duyn
Loomis, Calif.



LETTERS

Bravo for Humor

Re Charles Fitts' "Rival Gods of the Information Age" [CW, Sept. 22]: Bravo: Our field needs more insightful, delightful humor like this.

Robert L. Glass
Seattle, Wash.

Library System

The Integrated Library System (ILS) addressed in the article "Library System Targets Health Science Users" [CW, Sept. 15] was not, as indicated, developed by the National Technical Information Service (NTIS). ILS is an ongoing development of the Lister Hill National Center for Biomedical Communications of the National Library of Medicine in Bethesda, Md.

ILS Version 1.0 is presently being distributed by NTIS and available under the number identified in the article. While ILS has been designed as a totally integrated system, Version 1.0 offers circulation control, serials check-in and bibliographic file creation and maintenance among its major modules.

Other subsystems for catalog access, authority file control, acquisitions, cataloging and so forth are in process or planned.

Charles M. Goldstein
Chief, Computer Technology Branch
Lister Hill National Center for Biomedical Communications
Bethesda, Md.

No Simple Micro

Since no one from the Desktop Computer Division has spoken up, I must respond to the headline "Fastest Boat, Simplest Micro Win Cup Trials" [CW, Sept. 8].

The article greatly underestimated the sophistication of a Hewlett-Packard Co. desktop, which was probably the most sophisticated and powerful computer of the three, especially for the application. The HP 9825 is optimized for speed, compact size, ruggedness, instrument control and data gathering, not to mention ease of use and programming.

None of the others can compare to the 9825's true desktop size, NMOS 16-bit processor speed, HP-IB hardware/software and the HPL interpreter/programmer interface.

The 9825 is still the premier standard instrument controller, even though Digital Equipment Corp. PDP-11s and Data General Corp. minis reign in the minicomputer market. Just because the DEC and DG products have larger and more sophisticated siblings doesn't make the HP 9825 the "simplest micro."

Arthur Hu
Engineer
Hewlett-Packard Co.
Cupertino, Calif.

Final Say?

Is the shortest distance between two points a straight line in a programming language? Does every beginning have an end? When is a loop not a circle? The answer to questions such as these is not the answer itself since most questions are adjectival in a programming language.

Logic, as applied to design and development, is either true or false and at best, can only produce the desired results. Results then must rely upon an approach which directly reaches a point that is the end and not continue in circles from the beginning.

Perform if you must and go to "wherever" when needed, circling when required, dropping in at times, or dropping out where possible only ends upon completion and are tandem to the program at best.

The circle that starts must end and so must a program, but the results are the end product and must not reflect any circumjacence programming. STRUGOTO adheres to all programming rules and is the topic of conversation at most Italian restaurants.

I hope this letter puts an end to the "GOTO/structured" argument.

Frank Shiner
McLean, Va.

Computerworld welcomes comments from its readers. Preference will be given to typed, doublespaced letters of 150 words or less. *Computerworld* reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to Editor, *Computerworld*, 375 Cochituate Road, Rt. 30, Framingham, Mass. 01701.

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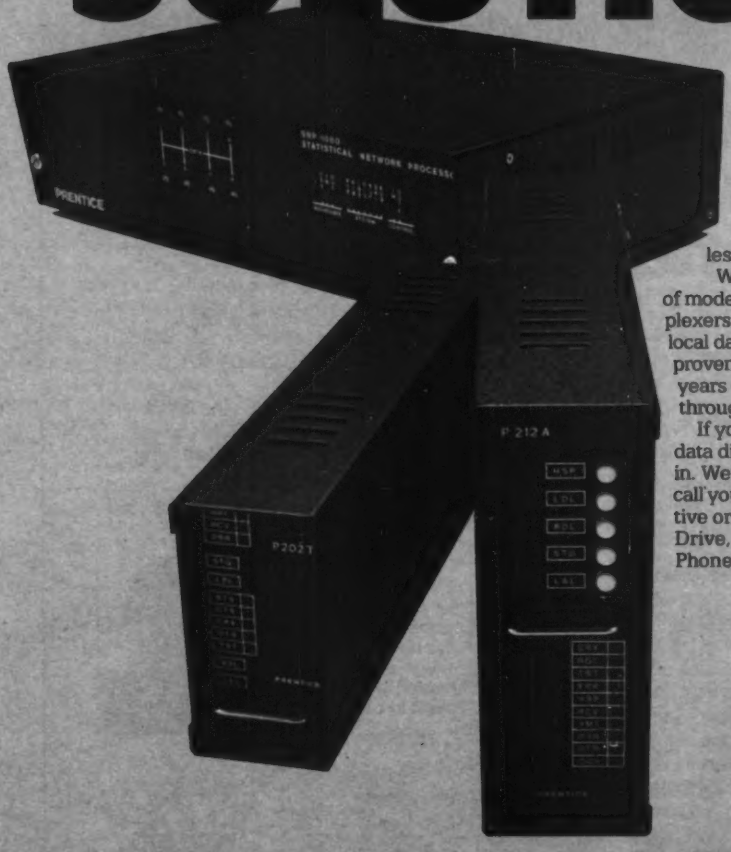

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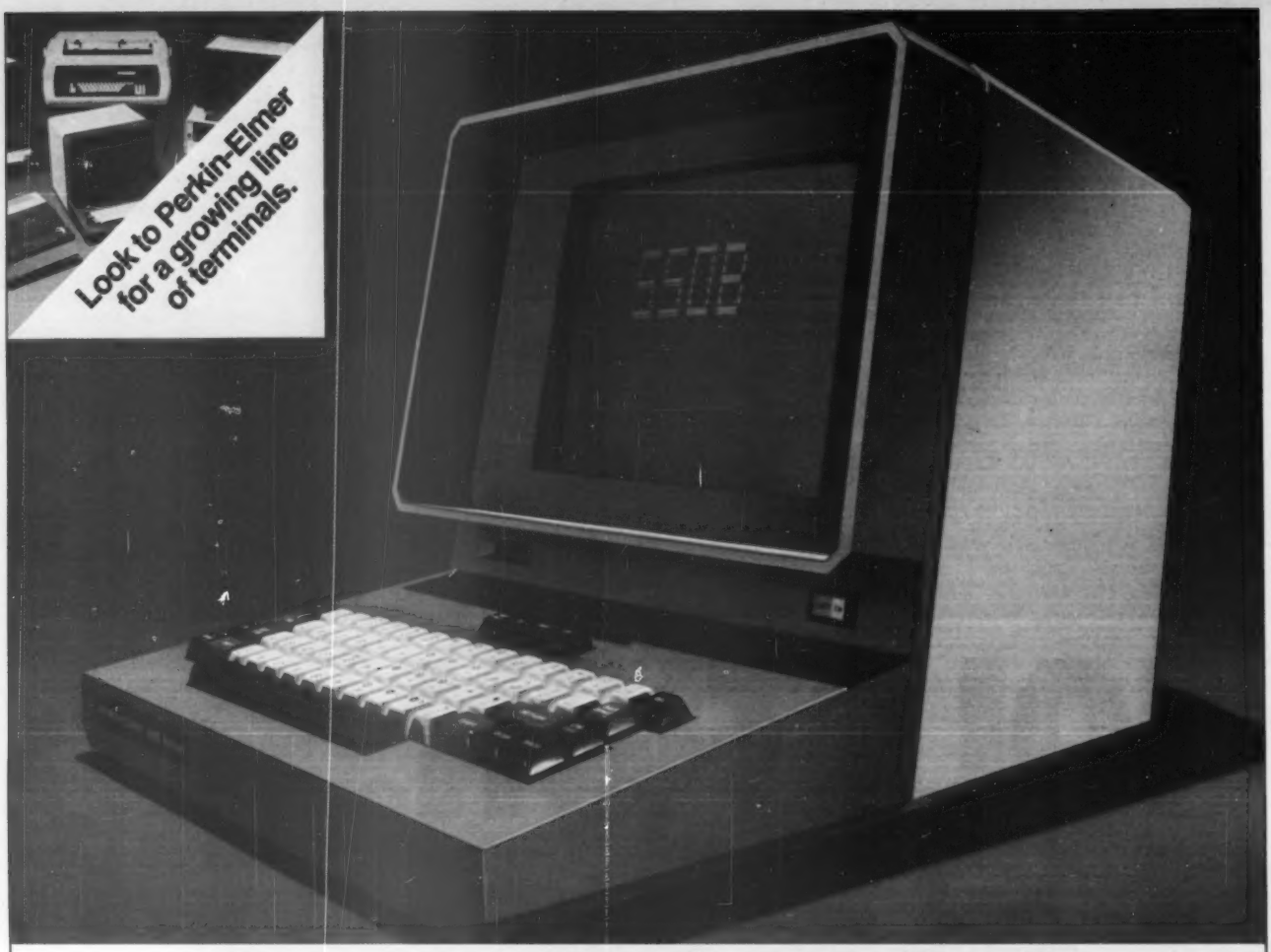

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For more information on the 550B write: Perkin-Elmer, Terminals Division, Flanders, NJ 07836. **Or call toll free: (800) 631-2154. In NJ, call (201) 584-1400.**

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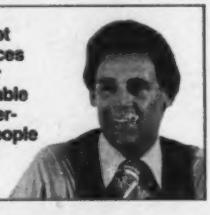

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Well-Drawn RFP

Questionnaire Eases Selection Trauma

By Christine J. Cobb
Special to CW

GREENSBURG, Pa. — The Allegheny Power System, Inc. (APS), a large electric utility, determined a need for a comprehensive materials management system two years ago. Functional specifications were developed with the active help of affected users.

Although APS intended to purchase a software package for the computerized portions of the system, the functional specifications were developed in great detail in order to ensure that user needs were defined for the software evaluation.

A request for proposal (RFP) was developed from these specifications and included:

- A conceptualization of the information flow.
- Resource documents to further detail the proposed system including formatted screens and reports, a dictionary of terms and data elements and record layouts of interfacing systems.
- A detailed questionnaire (Figure 1) for the vendor to complete.

The RFP instructions emphasized that failure to complete the questionnaire would invalidate the bid. Vendor response ranged from a refusal to complete the questionnaire to enthusiasm for the method. Of the seven vendors who bid, five completed the questionnaire.

Two Sections

The questionnaire consisted of two sections. The first contained 419 questions on functional design, the second was a checklist of major data elements desired in the software package.

The functional design questions were quite specific — for instance, asking not only if the software system performed a specific function, but if it was performed in a way conceptualized by APS; asking not only if a type of report or on-line screen was available, but if certain main elements of information were included.

The vendor was asked to answer yes or no to each question, to provide the cost of contractual services to modify his system to include the item and to reference where information about the item appeared in the vendor proposal. An example of the questionnaire is shown in Figure 1.

	Yes	No	Cost of Contractual Services to Include Item:	Specifics Referred to in Proposal On Page:
2-18. Can an on-line inquiry be made to the requisition file listing those requisitions which have not be placed on inquiry, purchase order or canceled?	—	—	_____	_____
2-19. Can this listing (2-18) be arranged first by user location number and then by requisition date?	—	—	_____	_____
2-20. Can a listing be made available of all requisitions which are open for more than three days and have not been placed on inquiry, purchase order or canceled?	—	—	_____	_____
2-21. Can a report be produced of multiple line requisitions that have at least one item which has not been acted on?	—	—	_____	_____
2-22. Can on-line inquiry be made to see the status of each item on a multiple requisition?	—	—	_____	_____
2-23. Can this inquiry (2-22) be made by different numbers (requisition number, inquiry number, purchase order number) each unique to a particular item?	—	—	_____	_____
2-24. Can these unique numbers be linked so that all information for that item is accessible by either of the numbers?	—	—	_____	_____
2-25. If 2-23 and 2-24 are yes, can all requisitions involved on a particular inquiry or purchase order be listed by entering that inquiry number or purchase order number?	—	—	_____	_____

Figure 1. RFP questionnaire details functional items considered essential to users' needs. Vendors' responses form the material for a major part of the software evaluation.

Interpretation of the results involved four main steps:

- Users weighted the relative importance of the questions for their functional area. A scale of one to four was used. A four represented an item that must be answered "yes" to make the software package acceptable and was limited to three or four questions such as, "Is source code provided?"
- Spread sheets were prepared, listing each question, the weight for the question, the response of

(Continued on Page 56)

'Control/IMS' Gets Warning Option

SUNNYVALE, Calif. — Boole & Babbage, Inc. has released an option for its Control/IMS Realtime software that is said to feature automatic early warning of problems with IBM's IMS data base management system, automatic performance monitoring, rate of activity calculating and historical plotting.

The Control/IMS Realtime base product is an on-line, realtime system for detecting and diagnosing problems and evaluating performance in the IMS data base and communications environment. It runs on IBM 370 and compatible mainframes under the SVS, VS1 and MVS operating systems.

For automatic problem detection, the Asynchronous Services option enables the user to select potential IMS problem areas for monitoring and specify thresholds of activity and resource utilization for each area.

When these thresholds are exceeded, a warning message is automatically issued to the originating Lterm, IMS master terminal or the OS console.

The operator can then investigate the cause of the problem with Control/IMS Realtime's information services before IMS performance is impacted, Boole

(Continued on Page 58)

Cincom Adapts 'Total' to Run In Dibol Under DEC RSTS/E

CINCINNATI — A data base management system (DBMS) for users of the Dibol programming language running under Digital Equipment Corp RSTS/E operating system has been announced by Cincom Systems, Inc.

Minicomputer Total is said to combine the capabilities of data structuring with ease of use and low memory requirements.

The DBMS operates in the central mode, permitting multiple terminals, users and programs to access the data base simultaneously. Additional features of Total include systemwide recovery capabilities and data independence, said to allow record layouts, operating systems or computer hardware to be changed without impacting existing application programs.

Total costs $22,000 or leases for $975/mo. Cincom is located at 2300 Montana Ave., Cincinnati, Ohio 45211.

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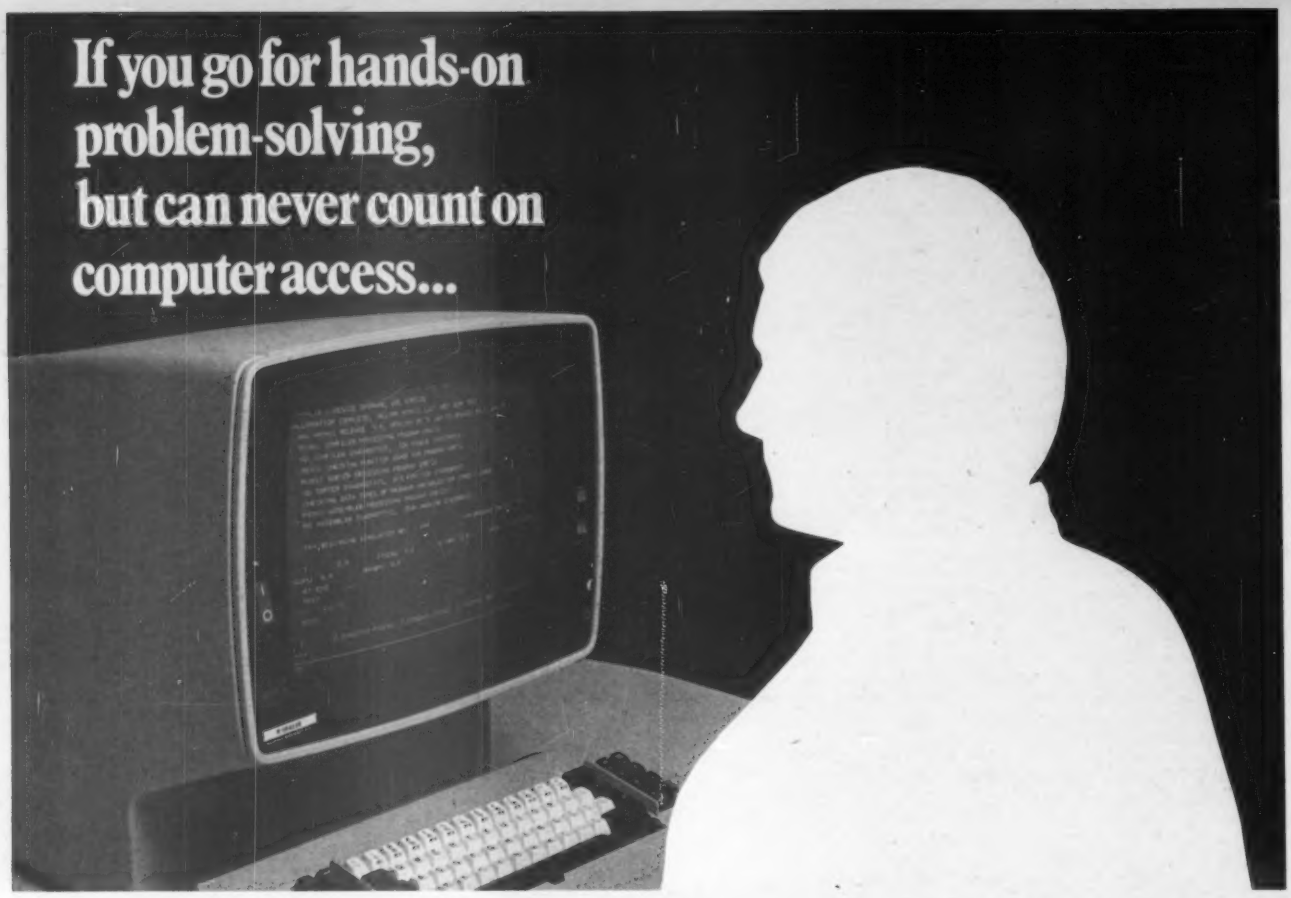

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'CICS/Inform' DOS Version Speeds Retrieval, Updates

BOSTON — Communication Software Aids has released a DOS version of CICS/Inform, designed to enable users to instantly retrieve and receive updated information internal to CICS.

The software is said to contain both global and specific monitoring facilities.

For global monitoring, the software displays the status of terminals, files, transactions, programs, tasks, dynamic storage, Vsam strings, Vtam and system control information.

Specific Monitoring

For specific monitoring, it displays memory and any disk records available through CICS access methods.

CICS/Inform is available with any IBM operating system and any release of CICS.

Available on a free trial basis, CICS/Inform also has rental, lease and purchase plans starting at $175/mo. The firm is located at Suite 618, 80 Boylston St., Boston, Mass. 02116.

Message System For CICS Users

RIVER EDGE, N.J. — A proprietary on-line electronic message processing system for users of IBM's CICS and CICS/VS teleprocessing system on single or multiple CPUs has been introduced by On-Line Software International.

The Omnicom software will send messages to one or more destinations and will search all terminals in a network for a specific user if necessary. Messages may be tracked, stored for future reference or displayed at recipient terminals either automatically or upon request, the vendor noted.

Omnicom may also be keyed into existing application programs to generate messages during the program run, a spokesman noted.

All messages are security-protected and the message network is fully managed, according to the vendor.

Omnicom costs $18,000 for OS and DOS installations from the vendor at Rt. 4 East, River Edge, N.J. 07661.

Business Applications Geared to IBM 5280

ORANGEBURG, S.C. — Ziegler and Co., Inc. has introduced business applications packages for the IBM 5280 distributed data system.

Accounts receivable and payroll are ready for installation, while Accounts Payable is due for release in December, according to a company spokesman.

Prices for an IBM 5280 and a Ziegler Application Package (ZAP) start at $400/mo from the firm at 1173 Boulevard N.E., Orangeburg, S.C. 29115.

CICS, 'Shadow' Support Added to Tone's 'FSO'

ANAHEIM, Calif. — Support for IBM's CICS and Shadow has been added by Tone Software Corp. to its Full Screen Output (FSO) product.

Prior to this, FSO ran only with the firm's Tone time-sharing system for IBM VS1 and MVS operating systems and with Applied Research, Inc.'s Roscoe monitor, a Tone spokesman explained.

With FSO, users may look at input as well as output data sets, search for character strings, set note points for later direct reference, page backward or forward, delete and spooled output, requeue it for later review or print in on the system printer.

The output commands act directly on the JES queue and no intermediate file is necessary, the Tone spokesman said.

Command Set

In addition to the output facilities, FSO provides commands which perform the functions of IBM's IEHPROGM utility interactively. A complete set of commands is also included to aid the systems programmer.

FSO is available on a free 30-day trial period. The one-time license fee is $7,500 with rental plans available from Tone at 1124 N. Gilbert Ave., Anaheim, Calif. 92801.

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	% Req. Met by Basic Unweighted	% Req. Met by Pkg. Weighted	% Req. Met by Modif. Pkg.	Cost to Modify	% Req. Met by Basic Unweighted	% Req. Met by Pkg. Weighted	% Req. Met by Modif. Pkg.	Cost to Modify	% Req. Met by Basic Unweighted	% Req. Met by Pkg. Weighted	% Req. Met by Basic Unweighted	% Req. Met by Pkg. Weighted	% Req. Met by Modif. Pkg.	Cost to Modify	% Req. Met by Basic Unweighted	% Req. Met by Pkg. Weighted	% Req. Met by Modif. Pkg.	Cost to Modify
Operating Requirements	90%	83%	90%	$ 990,000	83%	83%	100%	$ 99,000	91%	93%	91%	93%	100%	No Costs Given	41%	50%	100%	$ 990,000
a. Conversion to Total				990,000				99,000										99,000
b. On-Line				990,000														990,000
c. Memo Update				99				No Specific Costs Given										99,000
Purchasing	61	63	100	99,000	71	72	100		79	80	67	68	100		38	39	99	990,440
Stores	81	82	100	99,000	78	79	100	990,000 Total	72	71	66	65	100		68	69	100	990,000
Cataloging	69	71	100	99,000	96	96	100		76	80	55	58	100		53	59	100	99,000
Work Order Materials Management	80	78	100	99,000	65	63	100		65	67	55	59	100		65	63	100	
Accounts Payable	89	90	100	99,000	96	99	100		DID NOT BID						81	84	100	99,000
Management Reports	52	54	94	99,000	47	50	100		26	27	23	24	100		28	29	99	99,000
System Interfaces	100	100	100		75	75	100		0	0			100		0	0	100	99,000
Total System	69	70	99	2,574,000	72	73	100	2,970,000	65	67	48	50	100		50	51	99.5	4,554,000
Additional Costs	(Out of Pocket Expenses) (Precision Fit)			990,000 990,000											(Testing, Implementation, Conversion)			1,100,000
Basic Package				990,000				990,000					900,000					900,000
Total				$5,544,000				$3,960,000					900,000 (?)					$6,454,000
Estimated Finish Date	March 30, 1982				With Total Conversion 13 mos. Oct. 30, 1981 Without Total Conversion 9 mos. June 30, 1981				No Estimate Given						April 3, 1982			

Figure 2. This report contains the tabulated results of the RFP questionnaire. Vendors' responses are weighted on a sliding scale.

(Continued from Page 53)
each vendor for his basic system and his answer to whether his system could be modified to include the item. There was a column named, Acceptable Alternative, marked "yes" when the vendor described an acceptable way of handling the function.

If a vendor answered "no" to one of the questions considered vital to the package, the answer to that question was investigated further through vendor literature and personal contact. If the "no" answer was confirmed, the vendor was disqualified and not investigated further.

• The percentage of "yes" answers to total possible "yes" answers for both the basic package and the modified package was calculated. Both weighted and unweighted percentages were calculated, and in all cases came to within one percentage point of each other.

Percentages were calculated for each main functional area — such as purchasing or inventory control — and for the total system. An example of the resulting report is shown in Figure 2.

• A list of functions marked "no" was compiled for each vendor. Prices for modifying these functions were included where provided by the vendor. Although this pricing-by-function was difficult for the vendors since they tended to group functions differently from APS, it did enable APS to develop a shopping list of modifications.

The questionnaire forced the vendor to talk in the evaluator's language. Since the vendor presumably knows his system well and is expert in the functional area addressed by the software package, he should be qualified to translate his system into another's terms. This results in fewer errors in intepretation than if the evaluator performed this function on the basis of vendor literature.

In addition, vendors who fail to evaluate an RFP but return a bid with a collection of vendor literature and standard prices are effectively eliminated by the requirement to complete the questionnaire.

The evaluator saves time spent reading the vendor literature, trying to interpret it and discussing unclear items with the vendor.

Compiled results allow quantified analysis of the bid packages and provide additional insights that might not be immediately discernable upon reading the vendor literature. It is possible to rank vendors on the match between their packages and the functional specifications.

The list of "no" answers provides a focus for exploring literature and questioning the vendor during presentations.

Weighting of questions establishes the relative importance of each item to the user. This weighting and the shopping list of modifications can serve as a basis for balancing the relative costs and benefits when deciding which items will be authorized for modification.

The questionnaire also offers the vendor the advantage of judging the degree of fit of his system in the same manner that the software buyer will be evaluating it.

Future Evaluations

Several enhancements will be added for future software evaluations. One calls for developing a method of quantifying a qualifed "yes." Estimating the degree that the vendor performs the function by using percentages is a possibility.

Another will expand the weighting scale. A one to 10 scale rather than a one to four scale would provide more latitude for user discretion. It will probably provide more differentiation between the weighted and unweighted results than the 1% achieved with the one to four scale.

The most important change will be the grouping of questions into functional categories. The questionnaire was developed by following the RFP closely and asking step-by-step if the vendor performed a function as stated.

However, there should have been a further level of refinement for grouping and consolidating questions. For example, since APS had conceptualized an on-line system, many of the questions asked if a specific function was performed on-line. If further refinement had been made, the questioning would have been "Is this functional area performed on-line?"

One vendor received a low percentage rating, even though his system functionally addressed many of the questions, because his system was totally a batch system. Therefore, interpretation for this vendor required more of the evaluator's time.

Despite mistakes made, the results and the benefits received from the use of the detailed questionnaire greatly outweighed the time spent in questionnaire development.

Cobb is systems analyst, information services, for Allegheny Power System, Inc. in Greensburg, Pa.

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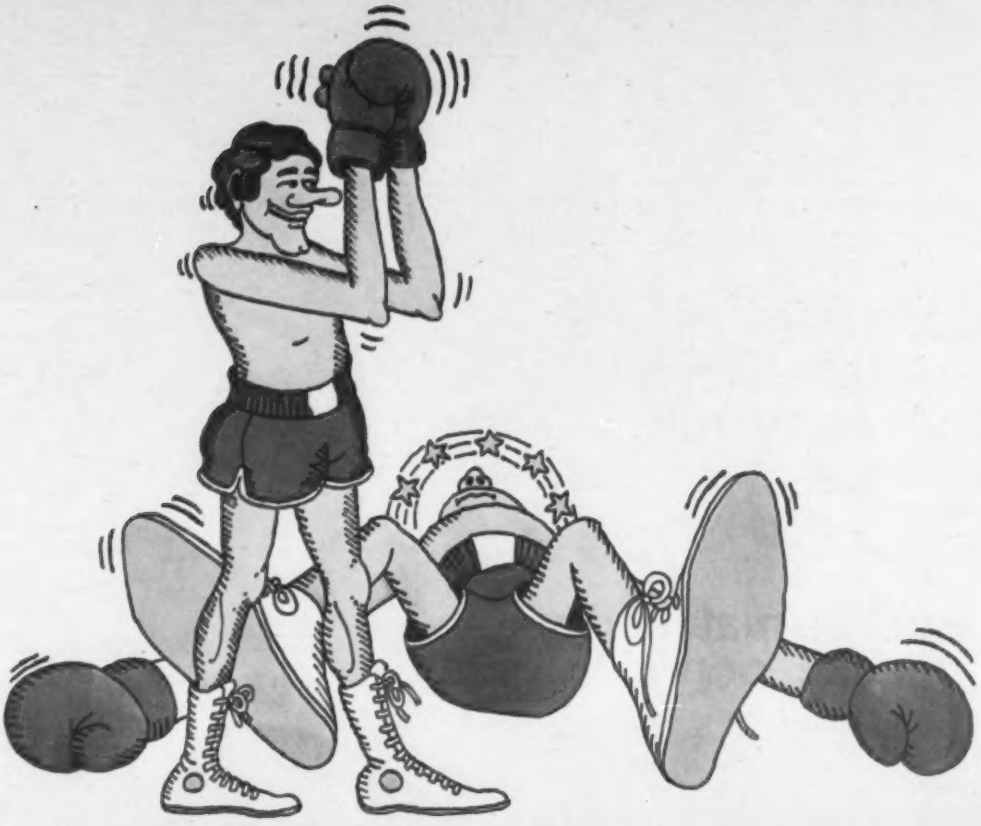

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Pro-Long Sponsors Contest On MPU Subroutine Design

MONTERREY, Calif. — Pro-Log Corp. is sponsoring a software design contest with more than $15,000 worth of prizes. The three top winners will receive Pro-Log M980 programmable read-only memory Programmers with personality modules to program 2716s, RS-232 interfaces and erase lights.

The contest closes Dec. 31. Contestants must submit a software routine "that performs a specific, professionally useful function," ProLog said.

The subroutine must be operable on an STD BUS system having an 8080, 8085, Z80 or 6800 MPU

Those who wish to enter the contest should write Dick Thomas, Pro-Log Corp., 2411 Garden Road, Monterey, Calif. 93940.

Micro Notes

The Electronic Gradebook, The Grade Program and the **Counsellor Element** are school administration packages for Apple Computer, Inc.'s Apple II and II Plus. Price: $49.95 for Electronic Gradebook and $89.95 for Counsellor. The Grading Program elements are $259.95 each. Vendor: Compusoco, 26251 Via Roble, P.O. Box 2325, Mission Viejo, Calif. 92690.

The Software Fitness Program is written in Cobol and runs under the Oasis operating system on Z80-based computers. It performs accounts receivable with billing and sales analysis, accounts payable, general ledger, inventory, payroll and job cost functions. Price: suggested retail, $500; and dealerships are available. Vendor: Open Systems, Inc., Suite 409, 430 Oak Grove, Minneapolis, Minn. 55403.

The Pascal Reference Card reportedly simplifies and condenses programming in Pascal, and the **Autodialer II** allows Apple Computer, Inc.'s Apple II users to easily dial ABBS, CBBS and Forum 80. Price: $2 for the card, $15 for Autodialer II. Vendor: Modular Software, Inc., P.O. Box 12883, San Antonio, Texas 78212.

Whatsit is a cross-referencing, self-indexing file system for micros running under Digital Research, Inc.'s CP/M, Northstar Co.'s micros and Apple Computer, Inc.'s Apple II and II Plus. Price: $150. Vendor: Hardhat Software, Inc., Box 14815, San Francisco, Calif. 94114.

The RA68000ML Resident Assembler and the **Link 68000 Linking Loader** (part of the assembler package) were designed for the M68000 family of micros. Price: $350 for the set. Vendor: Hemenway Associates, Inc., Suite 208, 101 Tremont St., Boston, Mass. 02108.

The Class Scheduling System operates on Apple Computer, Inc.'s Apple II and Apple II Plus. Price: $249.95; documentation manual only is $25. Vendor: Charles Mann & Associates, Inc., Micro Software Division, 7594 San Remo Trail, Yucca Valley, Calif. 92284.

Cincom now offers a complete DB/DC system for your 4331.

That can't be matched in performance–or price.

IBM's 4331 has the potential to offer users mainframe capability at a minicomputer price. But many have already found the performance of the 4331 to be disappointing, simply because the overhead required with DL/1 and CICS overwhelms the CPU. This becomes a critical problem when most new sophisticated applications are based on DB/DC.

Cincom's new DB/DC system enables the user to optimize his 4331 performance with minimal overhead requirements. At the foundation of this system are Cincom's 4331 TOTAL® and 4331 ENVIRON/1®, products whose inherent strengths have been enhanced for the unique operating requirements of the 4331. These include: the Fixed Block Architecture disk drives; the enhancements to DOS/VSE; the system's emphasis on data communications; and potential for distributed processing.

Building on this foundation, users can easily solve every on-line requirement and maximize productivity through the use of Cincom's facilitative software, which includes: LMS-II, our on-line program development system; ENV-DATA, our on-line end user data entry system; T-ASK, our on-line query system; SOCRATES, our data extraction and reporting system; and our integrated Data Dictionary.

In addition, Cincom's fully compatible 4331 DB/DC system simplifies growth from the System/3 and 34 environment to all IBM mainframes and operating systems. This complete solution is important to the first time mainframe user and the user building sophisticated distributed processing systems.

Along with superior performance Cincom's 4331 DB/DC system offers a price advantage designed to meet your unique needs. The data base rental starts as low as $385 per month and the on-line system starts at $340 per month.*

4331 TOTAL, E/1 Performance

4331 DL/1, CICS Performance

For complete details on how Cincom's 4331 foundation and facilitative software can provide you with superior price/performance, write or call Dennis Yablonsky, our Systems Software Sales Manager, at (513) 662-2300.

*These prices apply only to the U.S. and Canada.

Cincom Systems, Inc.
2300 Montana Ave.
Cincinnati, Ohio 45211

'Control/IMS' Gets Option For Early Warning

(Continued from Page 53)

& Babbage said.

For performance evaluation, Asynchronous Services enable the user to specify the area of IMS that will be monitored automatically. The user specifies resource or condition to be monitored, the type of measurement to be performed and the sampling rate, a spokesman said.

The user also specifies when an asynchronous service will be activated and the sampling interval. The collected data can be graphically displayed in short- or long-term plots.

In addition, rates of activity can be calculated and the frequency of IMS events graphed automatically, a spokesman said.

The Asynchronous Services option is available for $6,000. The complete Control/IMS Realtime product with the option costs $19,000, Boole & Babbage said from 510 Oakmead Parkway, Sunnyvale, Calif. 94086.

PDP-11 Gains Graphics Program

MANHATTAN BEACH, Calif. — An interactive graphics program that reportedly enables users with little programming experience to construct and annotate graphs from data stored in a computer file is being offered by Syscon Design, Inc.

DL100 is available for Digital Equipment Corp. PDP-11 computers using the RT-11 or TSX operating systems and is compatible with Tektronix, Inc. graphics terminals.

The DL100 accepts English-like, one-word commands with up to four arguments. It is fully self-documented, so that the user can ask for the valid commands available or the description and syntax of a particular command at any time, the firm said.

The DL100's Executive mode allows the user to define the part of the graphics area to use and also the range of values to be plotted from the user's data. Plotting functions such as moving to a point, drawing a line and displaying text horizontally or vertically may be performed and the position of the graphics cursor may be controlled interactively from the keyboard. The Symbol mode allows the user to define a figure and the Plot mode allows the user to define the graph particulars.

The DL100 costs $650 for a single-system license from Syscon Design, Suite F, 815 Manhattan Ave., Manhattan Beach, Calif. 90266.

'Abend-Aid' Update Backs Assembler, Fortran, PL/I

SOUTHFIELD, Mich. — Tomark, Inc. has announced Release 3.0 of its Abend-Aid package, including new support for assembler, Fortran and PL/I, as well as increased support for Cobol and IMS.

Release 3.0 is said to require no special programmer action or additional overhead. The product reportedly will take control only after all special error handling has been completed.

Once in control, Abend-Aid acts like a programmer and analyzes computer storage to determine the cause of the problem. It then provides the programmer with an English explanation, along with pertinent data for correction.

A permanent license for Abend-Aid is available for the MVT, SVS and VS1 operating systems for $6,475 and the MVS operating systems for $8,475. The IMS option costs $1,500 from the firm at 29433 Southfield Road, Southfield, Mich. 48076.

Disk Backup For Univac VS/9

DARTMOUTH, Nova Scotia — A utility program developed to give disk backup and recovery capability to Univac VS/9 systems has been released by Cosmopolitan Software Services Ltd.

Powerdump/Restore operates in disk-to-disk and disk-to-tape backup modes.

The program licenses for $3,500 for the first CPU and $2,500 for each subsequent one, the vendor said from Suite 806, Queen Square, 45 Alderney Drive, Dartmouth, Nova Scotia B2Y 2N6.

Graphs Package Fits HP 3000

GAITHERSBURG, Md. — Arens Applied Electromagnetics, Inc. has adapted its Management Information Graphics and Engineering Charts and Graphs package to run on Hewlett-Packard Co. 3000 series minicomputers.

Originally announced for Honeywell, Inc., Digital Equipment Corp. and IBM mainframes, the package is said to produce multicolor, camera-ready visuals or overhead projection transparencies.

The HP 3000 version costs $15,000 for the full package, $6,000 for a query and draw module and $3,000 for a draw module only, the vendor said from 435-A E. Diamond Ave., Gaithersburg, Md. 20760

BIMSPOOL DOS/VS(E) Terminal Printer Spooling
Retrieves batch print from POWER/VS queue, converts and prints on 3270-type terminal printer via CICS or SHADOW. May be used to eliminate RJE printers. $4000 or $200/mo.

BIMSERV DOS/VS(E) Library Display
Displays directories and entries in all DOS/VS(E) libraries, plus Label Area and VTOC's. (CICS) $1480 or $74/mo.

BIMDSLOG DOS/VS(E) Console Hard Copy File Display
Used by operators or programmers to review DOS/VS messages via CICS or SHADOW without tying up system console. $720 or $36/mo.

BIMMONTR DOS/VSE System Status and Queue Display
The original and still best DOS/VS(E) system activity, performance measurement, POWER/VS queue, and POWER/VS job output display system. (CICS) Numerous options to assist operators, programmers, and systems programmers. $920 or $46/mo.

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Datapro's new, objective directory service to help you save time and money locating, evaluating and selecting small computer systems.

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- **Twenty-four key application areas** linked to listings of pertinent systems, software, services, reports and profiles.
- **Eight vendor directories** with over 16,000 entries of systems, peripherals, software, services and maintenance companies.

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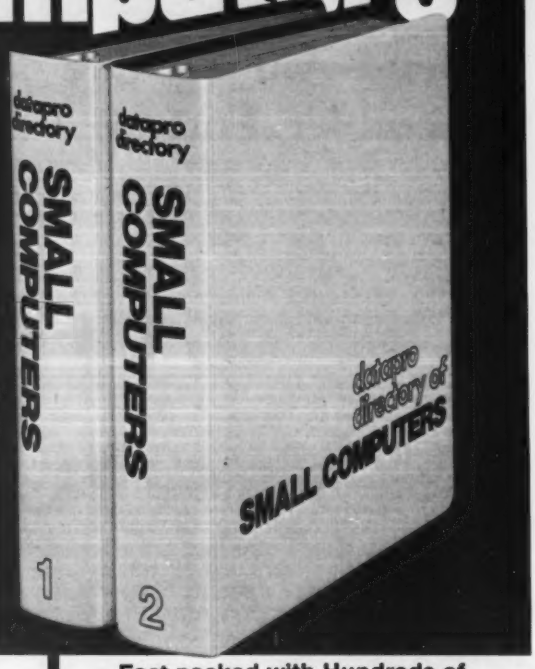

Here's A Sample Of What's Inside. . .

General Index
Your key to fast and easy access to the entire service. Multi level indexing takes you directly to the information you need—by system name, company name, key words, application, report title, section, directory and many other helpful "pointers."

Applications Index
To help you find everything relevant in the service to each of 24 applications areas—(e.g., Manufacturing: all companies, products, services, software, advice, and more.) Included are:
- Accounting
- Banking and Finance
- Computer Management Aids
- Data Communications
- Data Management and Database Management
- Education
- Energy Conservation and Management Systems
- Legal
- Management Sciences
- Manufacturing
- Mathematics and Statistics
- Media
- Medical and Health Care
- Payroll and Personnel
- Sales and Distribution
- Transportation
- Engineering and Scientific
- Entertainment
- Facilities, Security and Protection
- Government
- Insurance
- Word Processing and Text Editing
- General Applications
- Other Applications

User's Guide
A time-saving narrative that quickly familiarizes you with all aspects of the service, summarizes each major section, and helps you get even more for your money.

Inquiry Service
By phone or mail, Datapro analysts are at your service to help with your small computer questions. Convenient mail-in forms are included.

Basic Computer Concepts
The essential components and characteristics of small computer systems are explained, and are conveniently cross-referenced to the Glossary section.

Advice and Guidelines
"How-to" in nature and business-oriented in perspective these Datapro reports will show you:
- How to define and prioritize your basic business functions
- How to identify the costs of your current business information system (automated or manual).
- How to compare your current costs to the costs of new in-house small computer system.
- How to estimate how expensive a system you need.
- How to identify potential computer systems suitable to your business and economic requirements.
- How to evaluate these systems.
- How to determine whether to "make or buy" your software packages.

Personal Computers
Definitions, history, market insights, applications and future trends are summarized to help you better evaluate specific product reports in the service.

Small Computer Systems
Hundreds of brief, easy to read reports on individual small computer systems. Each system report includes:
- A concise summary
  - Current Models
  - Memory
  - Base List Price
  - Typical List Price
  - Primary Uses
  - Popular Options
  - Principal Applications
  - First Shipments
  - Number Installed
  - Availablity
- Background Information
- System Characteristics
- Hardware/Packaging
  - Processor/Memory
  - Display
  - Keyboard
  - Direct Access Storage
  - Printers
  - Data Communications
  - Other I/O
  - I/O Electronics
- Software
  - Languages
  - Operating System
  - Utilities
  - Database Management Systems
  - Communications Support
  - Applications Programs
- Support Services
  - Documentation
  - Support
  - Terms and Conditions

Company Profiles
Uniform, easy to compare descriptions of over 900* companies involved in the manufacture, marketing, and servicing of small computer systems, including peripherals, software, maintenance and others. Included are industry leaders as well as many new, fast-growing entries to this burgeoning industry. Each profile includes:
- Company name
- Address
- Telephone
- Principal business
- President
- Director of Marketing
- Date founded
- Number of employees
- Sales volume
- Primary customers
- Sales concentration
- Product line description

Directories
Extensive listings of the thousands of companies involved with the small computer industry. Full names, addresses and phone numbers are listed alphabetically and by zip code. Cross-referenced to appropriate reports and profiles in the service to help you quickly locate additional information about their products and services. Included are:

Manufacturers/Integrators
Alphabetical Listing
Zip Code Listing

System Vendors and Stores
Alphabetical Listing
System Listing

System Distributors
Alphabetical Listing
System Listing
Zip Code Listing

Software Vendors
Alphabetical Listing
System/Processor Listing
Zip Code Listing

Peripherals Vendors
Alphabetical Listing
Peripheral Type Listing
Add-on Memory
Cartridge/Cassette Magnetic Tape
CRT Display Monitors and Terminals
Data Communications Devices
Disk Drives
Diskette Drives
Printers
Other Peripherals
Zip Code Listing

Computer Services Vendors
Alphabetical Listing
Zip Code Listing

Maintenance Companies
Alphabetical Listing
Zip Code Listing

Other Vendors
Alphabetical Listing
Vendor Type Listing
Zip Code Listing

* Figures change with monthly updates.

Fact-packed with Hundreds of System Reports and Company Profiles.

Here's a small representative sample of the System Reports and Company Profiles you'll find in the Directory of Small Computers:

System Reports

Apple II, III
Mattel Intellivision
Megatek Whizzard 5000, 7000
NCR 7500, 8100, 8200
North Star Horizon
Ohio Scientific Challenger, I, II, III Series
Point 4 Computer
Qantel 100, 200, 300, & 900 Systems
Radio Shack TRS-80 Model I, II, III
Smoke Signal Broadcasting Chieftain
Texas Instruments DS990, 99/4
Wang 2200 Series
Plus nearly 200 others.

Company Profiles

Basic Four Corp.
Centurion Computer
Cincom System Inc.
Condor Computer Corp.
Cromemco Inc.
Digital Equipment Corp.
Graham-Dorian
Harris Computer Systems
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With 'Fastcopy'

IBM's IEBCOPY Replaced

SAN FRANCISCO — A replacement software package for the IBM utility, IEBCOPY, has been announced by Idaps.

Fastcopy is said to provide all the services of IEBCOPY but uses "up to 95% less" of the system resources.

In addition to the reportedly improved performance, two additional utilities are included in the Fastcopy package: A PDS member cross-reference report program and a compress utility to compress all PDS data sets on specific volumes.

Fastcopy costs $2,500 for the first copy, with multiple copy discounts available. A 30-day free trial of the product is also available from the firm at 311 California St., Suite 700, San Francisco, Calif. 94104.

System/34 Finance Tool Out

FARMINGTON HILLS, Mich. — Software designed for financial planning and modeling on the IBM System/34 is now available from Accountech Systems, Inc.

The Small Business Financial Planning and Modeling System (Finplan) features a variety of projection reports including balance sheet, income statement, cash projection and ratio analyses. The system is menu-driven for all processing functions, a spokesman said.

'What If'

Finplan allows the business planner or accountant to express results in thousands, hundreds or whole dollars. Its 12 account relationship functions allow the user "what if" capability, the spokesman noted.

All reports may be printed on letter-sized paper.

The package is available for an introductory fee of $950, which includes a 30-day warranty, source and load programs and user documentation. Accountech Systems is at Suite 108, 28104 Orchard Lake Road, Farmington Hills, Mich. 48018.

Package Tracks System/34 Modules

LANSING, Mich. — Davidson Software Systems, Inc. is offering a source/procedure control package that reportedly keeps track of modules inside an IBM System/34 CPU.

The package records when modules such as menus, procedures or screens are changed. All the information is collected during normal programming maintenance.

The source/procedure control package supports RPG, Auto, WSU, SDA, SFGR, Cobol and Fortran and costs $500, from the vendor at P.O. Box 21002, Lansing, Mich. 48909.

Cobol Program Package Allows Transportable Code

WILMETTE, Ill. — David R. Black & Associates, Inc. is offering a Cobol program development package that allows users to develop transportable Cobol code.

The package develops code in Ansi '74 Cobol. Modules include a data dictionary, a screen generator, a program generator and a report generator. The package also offers master system menu control and source-code control and data base management system support, the vendor said.

The package costs $27,500, the vendor said from 218 Charles Place, Wilmette, Ill. 60091.

Software Buyers' Seminar Slated

DETROIT — A free seminar for prospective buyers of manufacturing application software packages will be held here Oct. 29, by Software International.

Subsequent sessions in the free series are scheduled on Oct. 30 in Cleveland, Nov. 12 in San Francisco, Nov. 14 in Dallas and Nov. 25 in Chicago.

Software packages will be discussed in relation to inventory reduction, improved customer service and various other business modifications.

Further details can be obtained from Software International, Elm Sq., Andover, Mass. 01810.

McAuto Users Offered GE Printer

ST. LOUIS — Remote processing customers of McDonnell Douglas Automation Co. (McAuto) now can lease a 300 line/min printer directly from McAuto and receive a consolidated monthly bill that includes both DP costs and hardware charges.

The printer, which is a General Electric Co. Terminet 9610/340, contains a microprocessor that emulates the IBM 3780 terminal and provides automatic sign-on into McAuto's data communications network, a McAuto spokesman explained.

The printer can be obtained from McAuto under a one-year lease for $300/mo or a three-year lease for $270/mo, plus installation and maintenance charges.

McAuto is located in St. Louis, Miss. 63166.

TCI Programs Cover Phone Applications

SOUTHFIELD, Mich. — Telephone Cost Management, Inc. (TCM) has announced programs for telephone cost allocation, reporting and control.

The TCM-I programs start at $150/mo for service bureaus, while a single-location license starts at $7,500, installed, from the firm at 25800 Northwestern Highway, Southfield, Mich. 48037.

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DRJM04-5 300MB Slave	DTU77
DRJM04 300MB + Controller	DTU125
DRWM05 300MB + Controller	Line Printers
RJM07 600MB + Controller	Memories
RWM07 600MB + Controller	11/34 → 11/70, VAX
RM07 600MB Slave	Systems

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PDP and DEC are registered trademarks of Digital Equipment Corporation.

Tool Compares Programs Without Line Numbers

WASHINGTON, D.C. — The Text Compairator, a program that compares two versions of a source program or entire libraries and reports on the differences without need of line numbers, is available to IBM VS1 and MVS users from Yingling Associates, Inc.

With the product, a user can keep an automated audit trail of all changes made to source programs, Yingling claimed.

The Text Compairator runs on any IBM 370 under VS1 or MVS and costs $3,000 for a one-time license fee after a free 90-day trial, the vendor said from 2208 Wisconsin Ave., N.W., Washington, D.C. 20007.

Designed for NCR I-8000s

Account Package Lets Users Grow

MINNEAPOLIS — An interactive accounting system for NCR Corp. I-8140 computers is available from Open Systems, Inc.

Known as the NCR Financial Accounting System, the software application allows total data base compatibility through NCR's I-8000 line as an end user grows, the vendor claimed.

Seven applications are included: accounts receivable with billing and sales analysis, accounts payable, general ledger, inventory, payroll, sales order processing and job cost. Using a building block approach, each application can stand alone or be used in any combination to provide an interactive system, a spokesman said.

The one-time license fee for the product is $1,000, the vendor said from Suite 409, 430 Oak Grove, Minneapolis, Minn. 55403.

Series/1 Gets Wanding

LUDLOW, Mass. — Computer Technologies, Inc. has announced software said to allow OCR-A wanding on the IBM Series/1 minicomputer.

Usable in inventory control environments, the package includes the following reports: activity by wand, inventory location and/or status, received and removed inventory.

The OCR-A print may be printed on the 4974 matrix printer or the 4973 line printer. Hardware required includes either a 4952 or 4955 CPU with 96K bytes of main memory, 9.3M bytes of disk on diskette memory, a printer and a CRT terminal.

The package costs $1,500. The firm can be reached at P.O. Box 259, Ludlow, Mass. 01056.

IBC System 40 Gets Finance Tool

CARSON, Calif. — IBC/-Integrated Business Computers, Inc. and Sage Consulting, Inc. have introduced their Business Management Systems applications software for the IBC System 40.

Packages include general ledger, accounts payable, accounts receivable, payroll, order entry/inventory, apartment management, construction management, mortgage management, escrow management and manufacturing management.

The System 40 supports up to five users, 128K bytes of main memory and up to 22M bytes of disk storage.

Four Modules

The four-module package including general ledger, accounts payable, accounts receivable and payroll costs between $4,000 and $5,000.

Order entry/inventory, apartment management and construction management cost $1,500 each; manufacturing management costs $2,000; mortgage management costs $3,000 and escrow management sells for $5,000 from the firm at Suite 306, 22010 S. Wilmington Ave., Carson, Calif. 90745.

Correction

Time-Sharing Resources, Inc.'s Fixed Price Time-Sharing Service [CW, Sept. 29] runs on V32 systems from Two Pi Corp.

Informatics Accounts Payable System is so versatile it can go on-line or on paper.

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IDMS Meets the 6 Key Factors for Success in Database Systems

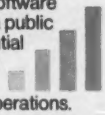
Find out why at a Free IDMS Seminar

Leading database consultants have stated that it is an absolute must that any organization considering on-line systems use a database management system. However, on-line systems demand a particular type of database management system, one that is capable of providing unusually high performance plus elegant backup and recovery facilities. However, users are also very interested in tools for fast application development and easy access to data by end users in an on-line environment. IDMS provides these facilities.

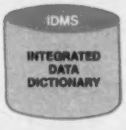
As a result, IDMS has proven an indispensable tool in supporting on-line systems with an extensive number of the most sensitive and important applications for business, industry, and government. From this unique experience has emerged new versions of IDMS and related facilities to support on-line systems meeting the diverse needs of application developers, end users, and processing departments. IDMS, supported by Cullinane Corporation, has been particularly successful because it meets the six key factors for success in database software. They are:

1. Vendor Record: Cullinane Corporation has an unparalleled record for vendor support. (Number One every year in Datapro ratings.) And with an unequaled record in system enhancement and new product development.

Cullinane Corporation is also the most financially successful database software company with the best growth record and highest earning rate of all software companies. As a result, in 1978, Cullinane Corporation was the first computer software company in ten years to have a public offering, thus providing substantial financial resources for product enhancement, new product development, and company operations.



2. Control Via an Integrated Dictionary: The Integrated Data Dictionary serves as the control facility for all information about the database and data communications environment. In addition, it integrates all components of IDMS facilitating easy application development, end user access to data, and efficient processing in an on-line environment.



3. Facilities for Fast Application Development: IDMS is the most powerful DBMS in the world. It allows applications designers to truly mirror a company's operations within the limits of the company's computer processing capabilities. However, users also want to develop applications faster with less skilled people. Simply stated, IDMS has easy-to-use tools for input processing, data management, and output processing. Traditional programming is greatly reduced via the Application Development System, On-Line Query, CULPRIT Report Generator, and the INTERACT on-line program development and word processing facility.

4. Easy Access to Data by End Users: In addition to the user facilities described above IDMS has On-Line English, the only true English language query facility for top management and other users. Management needs to tap the application's data flow easily; but more importantly, it needs the information immediately. On-Line English makes this a reality. Also, the user will not need to know anything about the organization of the database.

5. Computer Processing Efficiency: While users of on-line systems like ease of use, they demand high performance and sophisticated backup and recovery facilities. IDMS was designed to meet these requirements through its architecture which fully integrates the database and data communications facilities. IDMS DB/DC is fully multi-threaded providing for efficient processing in both the update and retrieval modes. Also, an application developed under IDMS DB/DC using the Universal Communications Facility will run under any other TP monitor without modification. In addition, IDMS includes a Shared Database System which supports multiple CPU's sharing databases, eliminating problems associated with shared DASD.

With the introduction of the IBM 4300, users want a system capable of supporting distributed database networks. IDMS is the only database system architecturally designed to support not only distributed access to a database but distributed databases, and combinations thereof.

A facility important to the IMS/DL1 user is ESCAPE which allows use of IDMS with IMS/DL1 applications without modifying the application programs.

6. Protection: DBMS users want two types of protection—protection that their investment in database applications will be protected from any changes in IBM hardware or software. IDMS is written in such a way as to make it virtually impossible for IBM to make any practical move that would make IDMS-based applications obsolete. In addition, Cullinane Corporation contracts state that it has the obligation to keep each user current with any new IBM developments.

DBMS users also want protection that their IDMS applications can be audited by themselves or their respective audit firms. Cullinane Corporation is the world's leader in EDP audit technology and offers user-oriented audit software including a library of audit routines especially tailored to the IDMS on-line environment. Thus, IDMS provides the user with complete protection, the only DBMS to do so.

Attend a free seminar in your area on the DBMS for On-Line Systems.

Free Seminars

Tailored to management, these seminars introduce the complete family of integrated software systems from Cullinane. Particular emphasis will be placed on the six key factors to success in database systems and on IDMS, the DBMS for On-Line Systems.

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14 Piscataway, NJ
15 Cincinnati, OH
16 Providence, RI
16 White Plains, NY
26 Baltimore, MD
28 Cleveland, OH
28 Columbus, OH
28 Grand Rapids, MI
28 Newport Beach, CA
28 Syracuse, NY
29 Montreal, QUE

NOVEMBER
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6 Westbury, NY
12 Des Moines, IO
12 Ft. Wayne, IN
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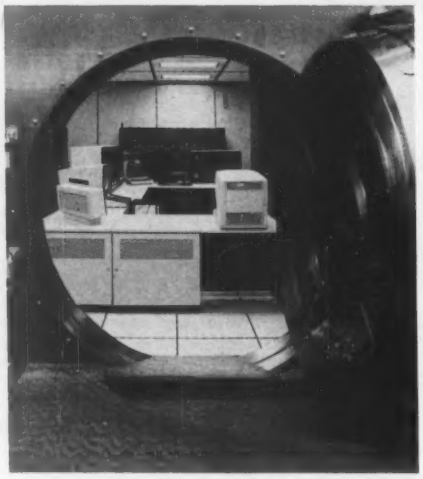

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Tool Prints CRT Image

GREENSBORO, N.C. — The Innovators, Inc. has announced Inno-Print, a package that reportedly gives Datapoint Corp. 1500, 1800 and 3800 minicomputer users the ability to print an exact copy of the image that appears on a CRT terminal screen.

The package costs $500 for a single-site license and $2,500 for an unlimited site license. The Innovators is at P.O. Box 13635, Greensboro, N.C. 27405.

Instruction Modules Cover Structured Program Design

TOPEKA, Kan. — Langston, Kitch and Associates, Inc. is offering a Structured Program Design Video series of instructional modules on the Warnier-Orr approach to structured system design.

The series covers the concepts and skills of structured design and includes a methodology for designing computer programs, with theories and tools to help the programmer solve most data processing problems, the vendor said.

The video-text format of the series lends itself to either individual or group instruction, the firm noted.

The program costs $9,800 and a three-module trial package is available for $50, which is deductible from the purchase price, the vendor said from 715 E. Eighth St., Topeka, Kan. 66607.

Package Offers Transport Analysis

LOS ANGELES — Informatics, Inc.'s Data Services Operation (DSO) has introduced a user-oriented, multimodal transportation analysis and reporting package called Transyt IV.

The package was designed specifically for transportation-related industries using DSO's coupled VM/VS systems.

The package is capable of analyzing, reporting and customizing information in specific data bases.

Full graphics capabilities are also provided as aids in network maintenance and development of plots, the vendor said.

Transyt IV is billed on an as-used basis, the vendor said from 21031 Ventura Blvd., Woodland Hills, Calif. 91364.

Video Service For Home Use

BAY CITY, Mich. — An in-home video-based interactive information service that is expected to offer video shopping, video funds transfer, video publications and video mail has been developed by the Software Publishing Division of Olamic Systems Corp.

The heart of Datavision is the Demand 90 software language, said to give viewers the capability to converse with information transmitters. The language reportedly gives users "a virtually unlimited choice of data to receive or send to another Datavision user," according to the developer.

The first data bases expected to be available to users are realty listings, Yellow Pages listings and a Telephone Directory Information Channel. Both phone lines and communications satellite services, such as Telenet or Tymnet, are currently being used to deliver the service.

For end-user commercial channels, the subscription price is $25/mo and 5 cent/-min, a spokesman said from 503 N. Euclid, Bay City, Mich. 48706.

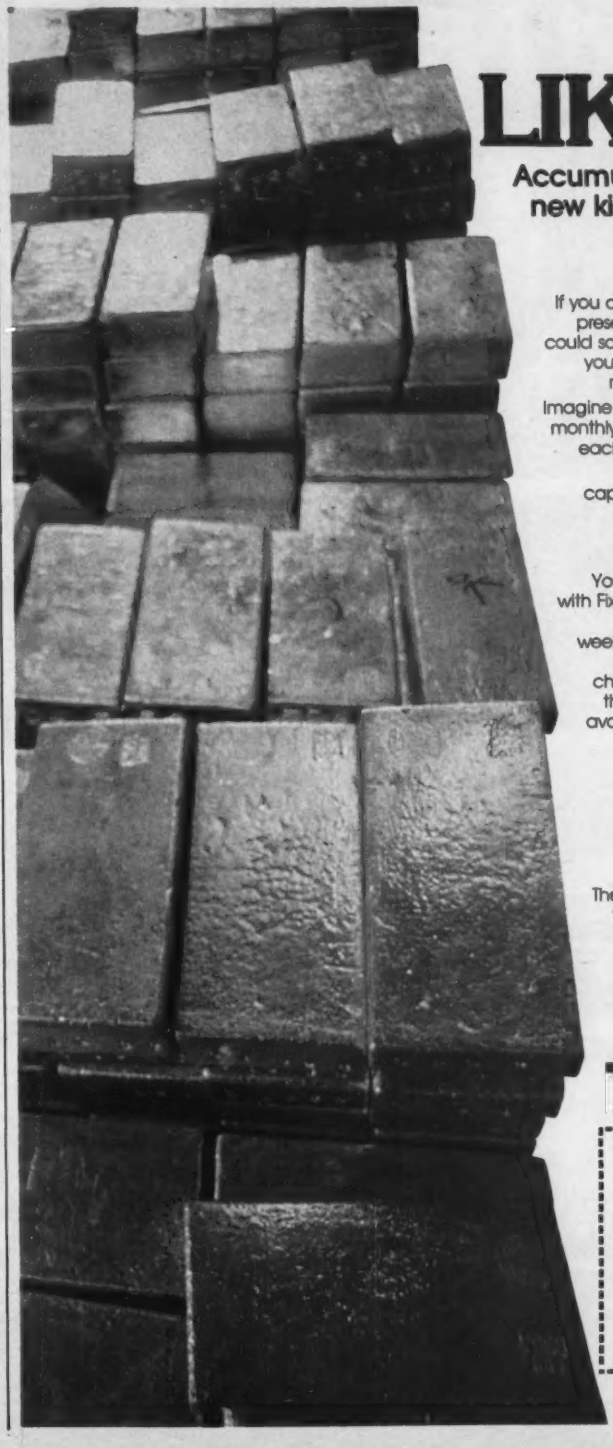
System-80 Runs On Tandem CPUs

PITTSBURGH, Pa. — Phoenix Systems, Inc. has announced that System-80, its on-line Cobol program generation system, is now available for use on Tandem Computers, Inc. computers.

System-80 works off key words in a data dictionary to produce Ansi 74 Cobol code to perform necessary program functions.

Using the product, a typical program in any application can be written in no more than 30 minutes, the vendor claimed.

The system is available to Tandem users for $19,500. The vendor can be reached at P.O. Box 7849, Pittsburgh, Pa. 15215.



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You will have all the timesharing you can use, at one fixed monthly rate – considerably under your present timesharing costs. You will receive the highest level of technical service and support.

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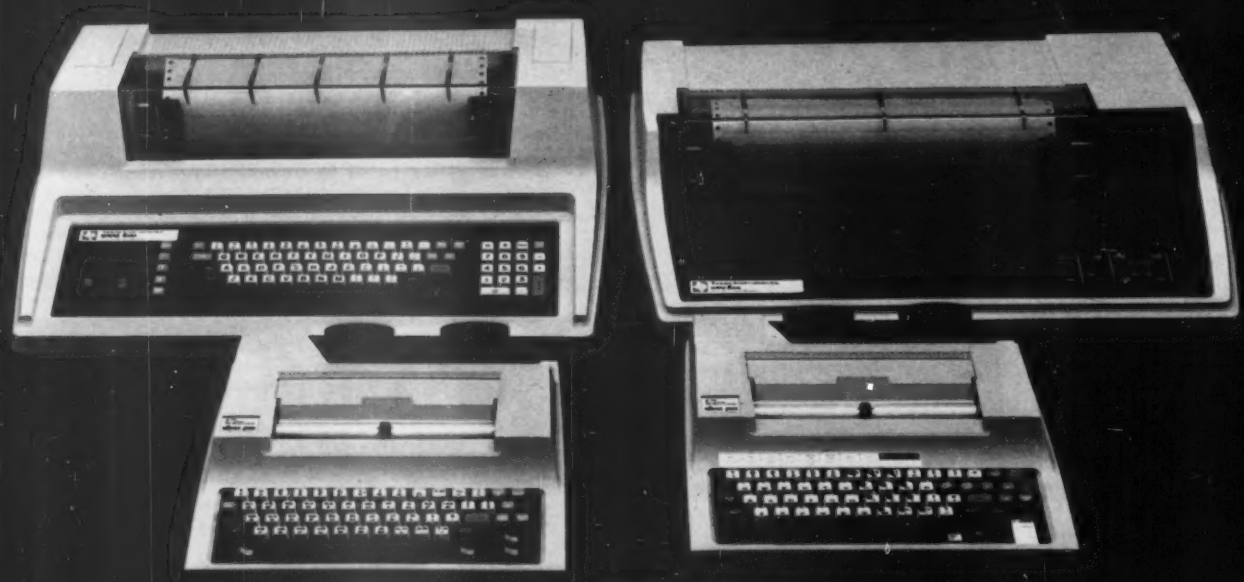

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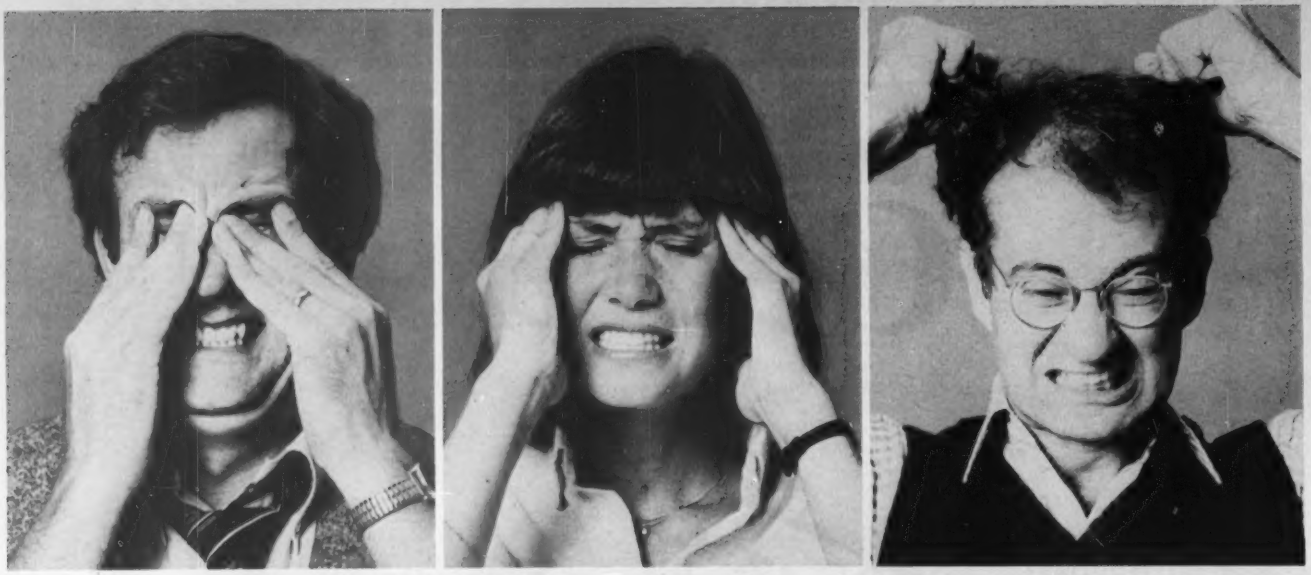

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Operators who use video display terminals all day know what a pain in the neck it can be.

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Meet the Ergonomic Terminal™ video display from Lear Siegler. The terminal that makes working conditions easier on the worker.

Ergonomics is the successful physical interaction between man and machine. It's the reason the Ergonomic Terminal was designed. For the most comfortable work environment possible and the convenience of the operator.

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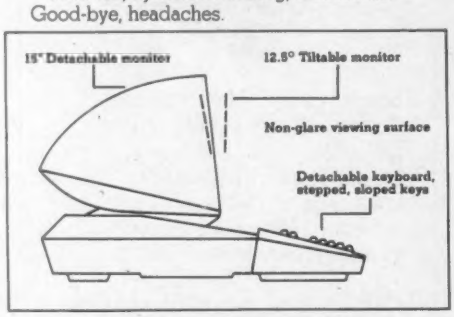
With the Ergonomic Terminal ADM-42, you get a large, non-glare 15" screen to cut down on sore eyes, tearing, and blurring. You get a high-resolution monitor (7 x 11 dot matrix characters) for the sharpest picture available. You even have separate contrast and brightness controls. A tiltable monitor lets you reposition the Ergonomic Terminal, so you don't have to reposition yourself. You can separate the keyboard and video display and locate them in any position you like. And the control base portion of the terminal can be remotely positioned out of the way.

Farewell, eyestrain. So long, backaches. Good-bye, headaches.



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The ADM-42 isn't just another pretty face. It's the smartest terminal in its class with full editing capabilities, a full array of visual attributes, flexibility of format, security, interface, and transmission. Not to mention four-page display as standard equipment. With an optional extended memory capable of adding data space up to a maximum of 8 pages.

The Ergonomic Terminal has a bright, easy-to-read 1920 character display (24 x 80), 128 ASCII character set, and 16 function keys (optionally programmable) that store 32 or 64 characters each.

It also comes with a 25th line established and reserved for status indicators and messages of up to 78 characters.

As if all this isn't enough, the ADM-42 comes with options. Galore.

So if you think the terminal you're using now is a real eyesore, consider the Ergonomic ADM-42.

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Capacity Changes Dynamically

Satellite Network Connects Univac Sites

By Phil Hirsch
CW Washington Bureau

WASHINGTON, D.C. — Increased flexibility is a key benefit of the broadband satellite network that Univac has been using for the past two years to interconnect its headquarters in Blue Bell, Pa., near Philadelphia, with plants in Roseville, Minn., and Salt Lake City, Utah.

"We can transfer transmission capacity dynamically from one site to another to accommodate changes in demand," System Manager Nate Pearlman explained. "With terrestrial facilities, such as Bell's Dataphone Digital Service [DDS], this is difficult and far more expensive.

"Also, the broad bandwidth of our satellite network allows applications to be added which might be hard to justify otherwise — teleconferencing, for example."

Higher throughput is another important benefit. Univac's satellite network, leased from American Satellite Co., provides an average bit error rate of $1:10^{-8}$. That is at least one order of magnitude better than telephone company-provided terrestrial facilities, Pearlman said, adding that uptime is also significantly better.

For the past four months, Univac's system, which runs around the clock, has had no unscheduled downtime. There were some problems earlier, but they related to modems, not transmission links, Pearlman explained.

Univac's satellite network consists basically of 5 meter earth stations — at Blue Bell, Roseville and Salt Lake City — linked to multiple 56K bit/sec, full-duplex transmission channels. There are two such channels between each pair of earth stations.

Users interface with the earth stations through Univac's DCP communications processor; among other functions, it acts as a packetizer/depacketizer. The earth station is within a few hundred feet of the DCP.

Besides data, the network supports high-speed facsimile transmission at 19.2K bit/sec, freeze-frame video teleconferencing at 4 frame/min over a 56K bit/sec channel and digital voice communication typically at 32K bit/sec, but as low as 19.2K bit/sec. The data transmissions operate at 9,600- to 56K bit/sec, and utilize a variety of Univac products — such as Uniscope Model 200 and 400 CRT terminals, UTS 700 batch terminals, V77 minicomputers, Series 9000 and System 80 processors.

Teleconferencing Use

The network is used about two hours a day for teleconferencing. "Although it has reduced our travel expenditures somewhat," H.J. Corning, director of communications and distributed systems, explained, "the major advantage of teleconferencing is that it increases productivity of our senior technical and administrative people. It's far superior to the telephone or the mails in any situation where people who are physically separated have to discuss text or graphic materials. They can look at the material simultaneously and work out changes in minimum time."

A typical application of teleconferencing at Univac involves the development of new communications software. This process re-

(Continued on Page 74)

Datapoint Makes Additions To ARC Applications Systems

SAN ANTONIO, Texas — Datapoint Corp. recently announced two additions to its Attached Resource Computer (ARC) applications systems.

The 3812 and 3822 workstation processors are said to provide ARC users with a more cost-effective means of performing data processing, word processing, program generation and electronic message services. The workstations incorporate most of the features offered in the firm's 3800 series processors, but have an internal Resource Interface Module (RIM) for interconnection to an ARC system.

The internal RIM eliminates the need for both the I/O bus and telecommunications adapter, a spokeswoman explained.

Datapoint will still offer the external RIM for users of its 3810 and 3820 processors and continue to use this type of ARC attachment where necessary, she added.

CRT Display

Like its predecessors, the 3812 and 3822 workstations feature an 80-char. by 24-line CRT display, with char.-by-char. inverse video and page mode and blinking cursor. Using the present or previous systems, users can create, edit, modify, format and manipulate documents and perform electronic mail functions over the ARC's electronic message system.

Purchase prices for the 3812, with 60K bytes of memory, and the 3822, with 120K bytes, begin at $5,950. One-, two- and three-year leasing terms are available, the spokeswoman said from the company at 9725 Datapoint Drive, San Antonio, Texas 78284.

Sycor Users Get IBM Link

NEW YORK — A multitasking communications program that permits transmissions between IBM 360, 370, 30 series and 4300 line of mainframes and remote Sycor, Inc. terminals has been introduced by Computer Dynamics, Inc.

The facility enables the Sycor Communications Program to transmit data over four communication lines simultaneously, the firm said.

The program runs under all versions of IBM operating systems including DOS, DOS/VS, DOS/VSE, OS, OS/VS1 and OS/VS2. It operates over switched or nonswitched lines and at rates varying from 1,200 bit/sec to 4,800 bit/sec and requires the use of a communications controller at the host computer.

Data is transmitted in an unattended mode, which enables communication to occur at off hours and eliminates the need for operator control, the firm said. On the Sycor side, the program communicates with the BSCAUT or $CC program.

The Sycor Batch Communications Program costs $12,000 for the multitasking version and $8,000 for the single-line version. Computer Dynamics is at 10 E. 39th St., New York, N.Y. 10016.

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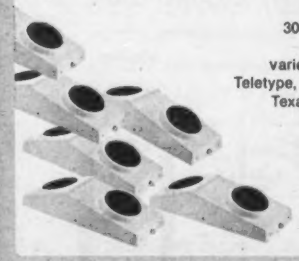

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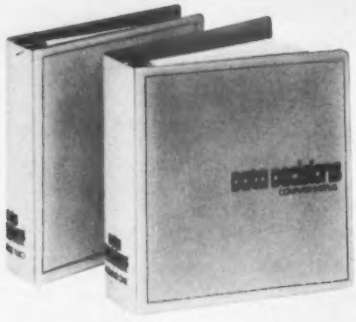

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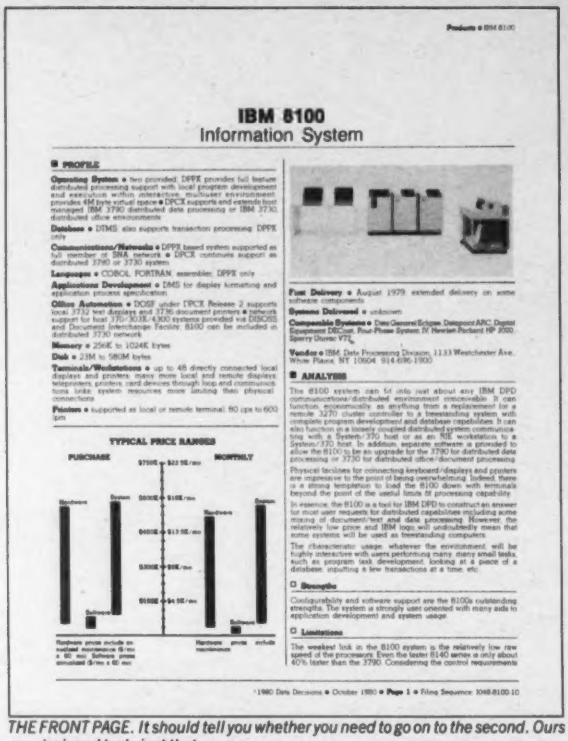

Products • IBM 8100

IBM 8100
Information System

■ PROFILE

Operating System • two provided. DPPX provides full feature distributed processing support with local program development and executes within interactive, multiuser environment. provides 4M byte virtual space • DPCX supports and extends host managed IBM 3790 distributed data processing or IBM 3730 distributed office environments

Database • DTMS. also supports transaction processing. DPPX only

Communications/Networks • DPPX based system supported as full member of SNA network • DPCX continues support as distributed 3790 or 3730 system

Languages • COBOL. FORTRAN. assembler. DPPX only

Applications Development • DMS for display formatting and application process specification

Office Automation • DOSF under DPCX Release 2 supports local 3732 text displays and 3736 document printers • network support for host 370/303X/4300 systems provided via DISOSS and Document Interchange Facility. 8100 can be included in distributed 3730 network

Memory • 256K to 1024K bytes

Disk • 23M to 580M bytes

Terminals/Workstations • up to 48 directly connected local displays and printers. many more local and remote displays. teleprinters, printers, card devices through loop and communications links. system resources more limiting than physical connections

Printers • supported as local or remote terminal. 80 cps to 600 lpm

Fust Delivery • August 1979. extended delivery on some software components

Systems Delivered • unknown

Compatible Systems • Data General Eclipse. Digital Equipment DEC/net. Four-Phase System IV. Hewlett-Packard HP 3000. Sperry Univac V77.

Vendor • IBM. Data Processing Division. 1133 Westchester Ave.. White Plains. NY 10604. 914-696-1900

■ ANALYSIS

The 8100 system can fit into just about any IBM DPD communications/distributed environment conceivable. It can function, economically, as anything from a replacement for a remote 3270 cluster controller to a freestanding system with complete program development and database capabilities. It can also function as a loosely coupled distributed system communicating with a System/370 host or as an SNI workstation to a System/370 host. In addition, separate software is provided to allow the 8100 to be an upgrade for the 3790 for distributed data processing or 3730 for distributed office/document processing.

Physical facilities for connecting keyboard/displays and printers are impressive to the point of being overwhelming. Indeed, there is a strong temptation to load the 8100 down with terminals beyond the point of the useful limits of processing capability.

In essence, the 8100 is a tool for IBM DPD to construct an answer for most user requests for distributed capabilities including some mixing of document/text and data processing. However, the relatively low price and IBM logo will undoubtedly mean that some systems will be used as freestanding computers.

The characteristic usage, whatever the environment, will be highly interactive with users performing many, many small tasks, such as program task development, looking at a piece of a database, inputting a few transactions at a time, etc.

□ Strengths

Configurability and software support are the 8100s outstanding strengths. The system is strongly user oriented with many aids to application development and system usage.

□ Limitations

The weakest link in the 8100 system is the relatively low raw speed of the processors. Even the faster 8140 series is only about 40% faster than the 3790. Considering the control requirements

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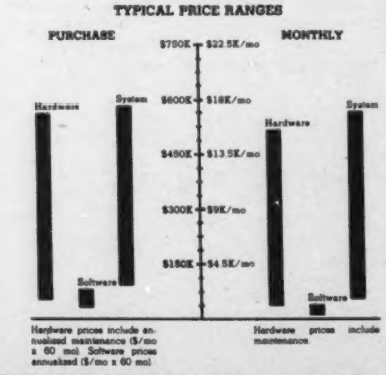

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Limited-Distance Modem, Test Set, CRT Switch Debut

LINCOLN, R.I. — International Data Sciences, Inc. (IDS) has introduced three communications products — a limited-distance modem, a data communications test set and a CRT selector switch.

The Model 6000 limited-distance modem, designed for synchronous operation over Telco or private 2- or 4-wire nonloaded metallic (twisted-pair) conductors, is available in two versions.

The 6000L operates at selectable speeds of 2,400-, 4,800- and 9,600 bit/sec, while the 6000H operates at 4,800-, 9,600- and 19.2K bit/sec. The modem can be used in point-to-point and multidrop network configurations for local data distribution up to 11 miles using 26-gauge wire. The Model 6000 modem costs $635.

Portable Test Set

The Hawk 4010 Datatrap — a portable, diagnostic data communications test set — is said to monitor and interactively communicate with data appearing at the EIA RS-232 interface. Data traffic is displayed on a 5-in., 512-char. CRT display.

The microprocessor-based 4010 operates with synchronous data rates up to 19.2K bit/sec in both half- and full-duplex modes. Asynchronous operation is provided by 16 internally-generated clock speeds ranging from 50- to 19.2K bit/sec. The Model 4010 costs $7,500.

The Model 8544-D A, B, C and D CRT selector switch reportedly allows the user to switch any two-wire input to any one of four two-wire outputs. The Model 8544-D costs $190.

Besides the products, the firm is offering a free catalog of recent additions to the 6000 series of products. The firm is located at 7 Wellington Road, Lincoln, R.I. 02865.

Expander Gives Modem Sharing

SAN MATEO, Calif. — Kapusi Laboratories has released the ME4, a modem expander that reportedly cuts data communications hardware costs by allowing several polled remote terminals to share a modem.

The ME4 uses point-to-point modem operation that can be retained in a multipoint network.

The ME4 is code-transparent to synchronous or asynchronous data up to 19.2K bit/sec. It meets EIA RS-232C and CCITT V.24 and V28 specifications.

Available as a stand-alone unit or mountable in a 19-in. rack, the unit costs $876, the vendor said from 2121 S. El Camino Real, San Mateo, Calif. 94403.

Transfer Unit Remote-Switched

NORWALK, Con.. — Datacomm Management Sciences, Inc. is now offering a dial transfer unit which provides remote control switching of a modem when used in conjunction with two dial telephone lines and two automatic Data Access Arrangement (DAA) units (CBT type).

The DTU-10 Dial Transfer Unit features "wrong number" protection, diagnostic indicators, self-test and a reset capability.

The DTU-10A allows for unattended transfer of a "standby" modem to replace an on-line modem on the same private line.

The price for the DTU-10 is $425, and the DTU-10A costs $525, the vendor said from 181 Main St., Norwalk, Conn. 06851.

Terminal Allows Character Recall

MINNEAPOLIS — A microprocessor-controlled interactive terminal that allows the user to recall or "replay" up to 7,680 characters or the equivalent of four full pages of previously displayed data is being offered by the Teleray Division of Research, Inc.

The Model 14 — Teleray's newest addition to its Series 10 CRT terminals — offers trailing-space and trailing-line suppression features, forward and backward scrolling through 200 or more previous lines of data, limited block-mode capability and function memory of 1,920 characters reserved for up to 32 programmable functions.

The Model 14 also features transmit and print terminator codes that may be selected, stored and transmitted to the mainframe or printer at desired points. Transmission stop-codes may also be selected. Also included are programmable I/O and peripheral data rates, programmable tabs and cursor symbol selection, wide character display and space-over-data modes. The Model 14 costs $1,890 from Teleray, Box 24064, Minneapolis, Minn. 55424.

Network Links Univac Sites

(Continued from Page 69)

quires frequent interaction between the designers, located in Salt Lake City, and technical staff at the manufacturing site, which may be either in Roseville or Blue Bell. According to Corning, the teleconferencing system frequently allows new software design and implementation questions to be resolved in a few hours or days, which otherwise would require weeks or months to settle.

There are drawbacks to using broadband satellite transmission that don't seriously impact Univac, but may cause problems for others. One is the propagation delay inherent in satellite transmission. Special protocols, software and hardware have been developed to overcome the delay, but they add to the user's system costs.

Another difficulty is that satellite broadband networks, like similar terrestrial networks, do not offer interfaces to all types and makes of terminals. The user therefore may have trouble exploiting the economies of broadband through consolidation of multiple existing facilities into a single integrated network.

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Short-Haul Optical Modem Includes RS-232C Assemblies

GENEVA, Ill. — An RS-232C-compatible short-haul optical modem has been developed by Belden Corp.'s Fiber Optics Group as part of a stand-alone optoelectronic data transmission system.

The Model 222001 Bit-Driver is said to provide asynchronous simplex and duplex data transmission at speeds up to 56K bit/sec. Depending on the type of standard Belden fiber optic cable selected, transmission ranges to 3,280 ft reportedly can be achieved.

The Bit-Driver system, which includes RS-232C molded cable assemblies, was designed for in-house and in-plant data communications between computers and peripheral units and for experimental use, according to the firm. The short-haul modems, used in pairs, are said to replace conventional telephone company equipment, eliminating equipment leasing and line charges.

The rear panel of Model 222001 incorporates an RS-232C interface using a 25-pin Type D connector. Also located on the rear panel are two AMP fiber optic transmission line receptacles.

The Model 222001 costs $280 from the firm at 2000 S. Batavia Ave., Geneva, Ill. 60134.

Modem Runs On Coax Cable

RIDGEFIELD, Conn. — Computrol Corp. has unveiled a modem that reportedly transmits and receives high-frequency synchronous clock and data on coaxial cable at rates to 1.5M bit/sec.

The Model 30-0080 makes possible the implementation of a single high-speed data path for processor-to-processor communication, remote multiplexing of distributed I/O functions, networking of terminals and computers and moving large packets of data in local area networks, the vendor claimed.

No adjustments are necessary for the modem to operate at any bit/sec rate up to 1.5M bit/sec and it can transmit over distances up to 27,000 ft without amplifiers or repeaters, a spokesman said. The price for the unit is $360, Computrol said from 15 Ethan Allen Highway, Ridgefield, Conn. 06877.

Kit Details Fiber Optics

PHOENIX — A fiber-optic evaluation kit to make systems designers familiar with the technology is available from Motorola Semiconductor Products, Inc.

Link II reportedly provides TTL transmitter and receiver modules which permit installation of a simplex link in excess of 1,000 meters. The kit includes the MFOLO2T transmitter module, MFOLO2R receiver module and 10 meters of fiber cable, preterminated with AMP connectors.

The components are supplemented by literature describing specifications, theory of operation and concepts.

Link II features the combination of Motorola ferrule fiber-optic semiconductors and AMP-compatible connectors, a company spokesman said.

The Link II kit costs $124.99 from Motorola at P.O. Box 20912, Phoenix, Ariz. 85036.

Halcyon Cuts Price Tags

SAN JOSE, Calif. — Halcyon Communications, Inc. has announced price reductions on its 800 series of data analysis equipment.

The 802A data link monitor, with optional real-time recording capability, now costs $4,995, down 34% from its former price tag.

The 803A Micro-Fox data link analyzer has been reduced 33% and is now available for $7,995.

SDLC and HDLC

In addition, both products now include SDLC and HDLC protocols, which were previously only offered as optional features, a spokesman stated.

Finally, Halcyon cut the price of its 804A microprocessor-based on-line data recorder by 17%. The device now costs $6,295.

The current price reductions were reportedly spurred by the firm's increased commonality in the 800 series circuit board design. Additional information on the products can be obtained from the company at 1 Halcyon Plaza, 2121 Zanker Road, San Jose, Calif. 95131.

Micro750 Takes Wideband Paths

SAN DIEGO — Micom Systems, Inc. has announced the Micro750, a time-division multiplexer (TDM) designed to operate on wideband data circuits operating at up to 250K bit/sec.

The Micro750 can divide bandwidth in several ways to let the user derive synchronous channels at lower speeds like: 2,400-, 4,800- or 9,600 bit/sec, the vendor said.

The unit can be used on 56K bit/sec DDS links or private microwave or laser communications links. It also incorporates several intelligent features such as single-ended configurations selection from a central site, the vendor said.

The Micro750 supports dial-up synchronous terminals as well as directly connected terminals. It also supports leased lines point-to-point and multipoint tail circuits, according to the vendor.

The unit is priced from $3,800, the vendor said from 9551 Irondale Ave., Chatsworth, Calif. 91311.

Optical Bus Extender Transmits 16 I/O Lines

CANOGA PARK, Calif. — Canoga Data Systems is offering a fiber-optic bus extender that transmits 16 parallel I/O lines over a single duplex optical fiber cable in a full-duplex mode.

The CBE-100 has a maximum I/O data rate of 200K 16-bit words. It offers an optional addressing feature and provides electrical interfaces for a full handshaking protocol.

Options include a single-ended tri-state or differential I/O separate lines for Transmit Data and Receive Data or a single bidirectional I/O bus.

The CBE-100 ranges in price between $2,500 and $3,000 the vendor said from 6740 Eton Ave., Canoga Park, Calif. 91303.

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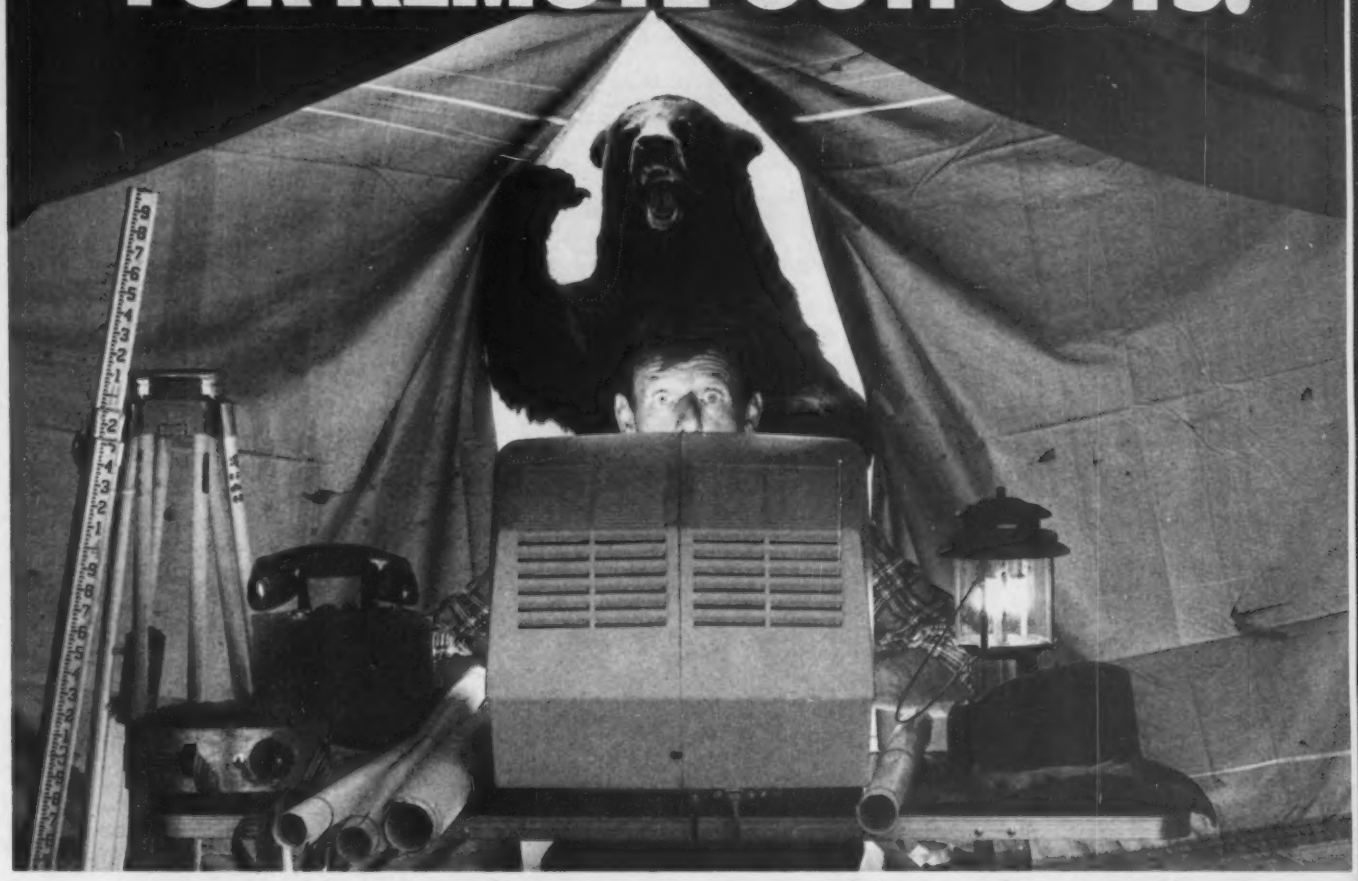

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Cluster Controller Links DEC Terminals, IBM CPUs

ROCKFORD, Ill. — Phone 1, Inc. is offering the Pl-5-3271, a cluster controller that will connect a Digital Equipment Corp. VT-52 or VT-78 terminal directly to an IBM mainframe.

The controller will simultaneously control eight local or remote terminals via cable or auto-answer modems. Communications from the Pl-5-3271 to the IBM mainframe is bisynchronous, the vendor said.

Phone 1 claims the DEC terminals look exactly like IBM 3277 terminals to the mainframe.

The Pl-5-3271 costs $9,200 from the vendor at 1011 River Lane, Loves Park, Ill. 61111.

Decwriter Tied to Bisync 3270

GRANDVIEW, Mo. — The BC-34 controller introduced by Computerwise, Inc. provides a means of connecting a Digital Equipment Corp. LA34 Decwriter acting as a receive-only device emulating a 3280 printer to an IBM 3270-compatible Bisync data link.

The BC-34 is a Bisync protocol controller designed to be internally installed in a DEC LA34-AA Decwriter IV terminal.

The BC-34 communicates with a host mainframe in accordance with standard IBM 3270 Remote BCS protocol, converts received data from Ebcdic to Ascii and transfers the data to the LA34 in serial asynchronous form utilizing the X-On/X-Off response from the LA34 to prevent data overrun, the firm said.

The controller with a LA34 Decwriter and Bisync data link costs $2,125 from Computerwise at 4006 E. 137th Terrace, Grandview, Mo. 64030.

Teletype 32, 33 Replaced

NEW YORK — Link Communications, Inc. has announced two models of tape punch/reader to be used with Teletype Corp.'s Model 43 Teleprinter as replacements for Teletype's Models 32 and 33.

The LPRM 800 is meant to replace Teletype's automatic send/receive (ASR) 33, and the LPRM 500 replaces the ASR 32 punch/reader.

Both units feature keyboard-programmable answerback, operation in either half- or full-duplex mode and built-in test capability. Interconnection with the Model 43 is said to require no special modifications.

The 8-level LPRM 800 is operable from a standard Ascii keyboard and is used with a modem for unattended (automatic answer) operation. It can be controlled either manually or by automatic reader and punch drive codes.

Each unit costs $2,350 from Link Communications, 161 Ave. of the Americas, New York, N.Y. 10013.

RS-232 Printers, System/34 Linked

PITTSBURG, Pa. — Expandor, Inc. is offering a printer interface that allows any RS-232 printer to be attached to IBM's System/34 minicomputer.

The Model PQ protocol converter is available for twinaxial cable installation. The Model PQ emulates an IBM 5256 printer and has internal device address select switches.

The converter automatically converts Ebcdic data to Ascii for the standard graphics character, a spokesman said.

The unit costs $2,995 from Expandor at 400 Ste. Claire Plaza, Pittsburgh, Pa. 15241.

NBS Book Covers DES Upkeep Tests

WASHINGTON, D.C. — Four maintenance tests for the federal Data Encryption Standard (DES) are described in a new National Bureau of Standards (NBS) publication entitled "Maintenance Testing for the Data Encryption Standard."

The 29-page publication describes the tests as independent of implementation.

The booklet (No. 003-003-02225-0) is priced at $2 and can be obtained from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

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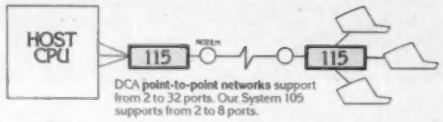

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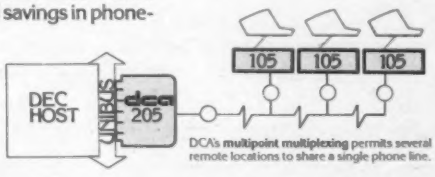

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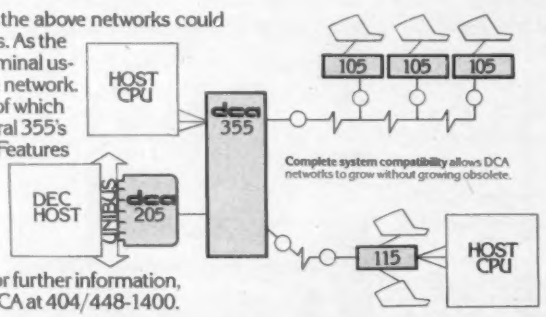

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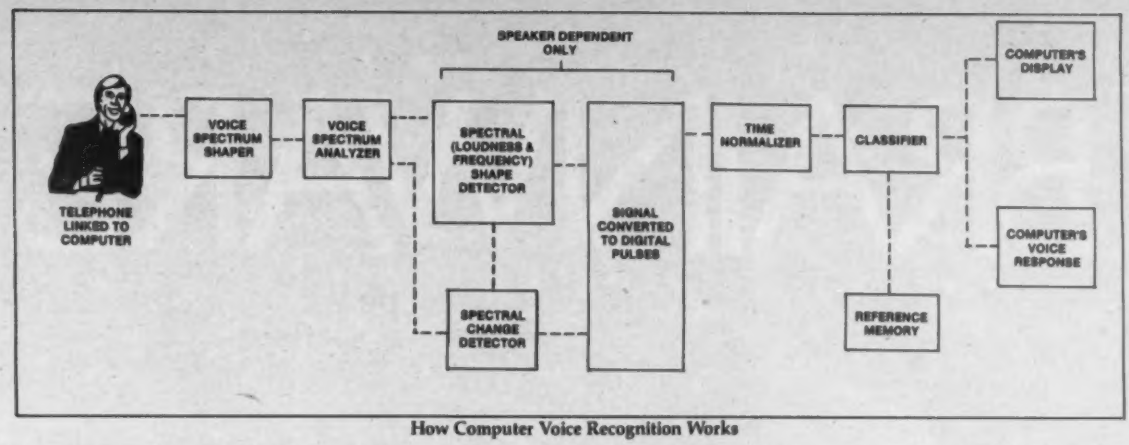

How Computer Voice Recognition Works

Natural Speech Recognition? Not til '90

By Rita Shoor
CW Staff

BOSTON — Computer voice systems have come a long way in the last four decades, but don't look for voice recognition of natural speech until about 1990. That prediction was made by James Waite of Verbex, Inc. during a recent speech before members of the Massachusetts chapter of the Data Entry Management Association (Dema) here.

In the 1940s, automated voice recognition was essentially a scientific curiosity, according to Waite. There was increasing research activity through the next decade with computer technology utilized in the research programs conducted during the '60s, he said. Among these were the experiments conducted on communication signals between humans and dolphins and the development of the Arpa network.

It was not until the first half of the '70s that speaker-dependent voice data entry systems were developed, Waite continued.

A speaker-dependent system is one that requires the speaker to train the system to his particular voice pattern, he explained. This might mean that the speaker would repeat one word — a number, for example — from three to 10 times while being careful to allow a significant pause between each repetition.

The next phase was the development of a speaker-independent system, according to Waite. This type of system allows the speaker to be recognized immediately with no preliminary system training required.

Verbex, which was known as Dialog Systems, Inc. until August and is now a member of the Exxon Information Group, has several working speaker-independent systems spread among its customer base. However, there are problems to overcome before total automation of verbal input that will result in a written document becomes a reality, Waite said.

Development Problems

One problem is the differences among various accents and dialects, Waite explained. A standard data base containing voice patterns would have to be broken into the following four segments — northern male, northern female, southern male and southern female — if it were to be used on a national basis in the U.S.

The higher frequency range of many female voices also causes confusion on the recognition graph, he said.

Another problem is caused by line noises, line switching bumps, echo suppressor effects and frequency distortion when the voice input is coming across on telephone lines, according to Waite.

All of these factors can cause difficulty in recognizing words such as "nine" and "five," particularly if the first sound in the word — the "f" or the "n" — is distorted or suppressed.

While it's evident how "nine" and "five" wind up sounding alike, Waite indicated that "six" and "eight" are also often incorrectly identified. "We haven't determined the reason for this yet," he acknowledged. He also pointed out that numbers are preferable to words when designing the vocabulary for a speaker-independent system.

Isolating and identifying the problems inherent in computer voice system technology is the first essential step to solving them, Waite maintained, and that step has already been taken. IBM and Texas Instruments, Inc. [CW, June 2, June 9] are among the companies currently involved with what he described as "strong research activity" on voice data entry products.

In fact, quantum leaps in the development of these products are a possibility within the next decade, he claimed. However, he admitted that current technology limits the vocabulary of almost all speaker-independent systems to between 20 and 40 words — and that's a long way from the natural speech input envisioned for the office of the future.

Add-In Unit Quadruples Density Of IBM Memory at Half Price

SANTA CLARA, Calif. — The use of 64K-bit memory chips enables an IBM-compatible add-in unit to offer four times greater density than its IBM counterparts for a price roughly 50% to 60% lower, according to a spokesman for the product's developer, Locom Corp.

The LCM Series 300 add-in memory fits entirely inside the "card cages" of large-scale IBM processors and boasts exactly the same cycle times and access width as the IBM mainframe memories it was designed to replace, the spokesman said.

Each of Locom's Series 300 memory boards plugs directly into the backplanes of IBM's largest mainframes, including the 370/158, 370/168 and 30 series models. Because they can be totally integrated in their associated CPUs, the add-in units occupy no floor space. This is in sharp contrast to the typical add-on, which operates externally to its processor and constitutes a separate subsystem.

Minimum Configuration

A minimum Series 300 configuration starts at 2M bytes and can reportedly expand to a maximum of either 8M- or 16M bytes, depending on the processor model involved. For the 370/168, 3032 and 3033, the add-in memory's maximum capacity totals 16M bytes; for the 370/158 and 3031, it totals 8M bytes.

Although it hardly qualifies as the only IBM-compatible add-in memory available today on the market, the Series 300 is believed to be possibly the first such product to take advantage of the same technology incorporated in 4300 series mainframes.

At the the heart of the Locom product lies a 64K-bit random-access memory (RAM) chip, which offers four times the density of the 16K-bit modules that still form the foundation of IBM's 370- and 30 series-class main memories.

Locom's 64K-bit dynamic RAM, which is supplied by Fujitsu Ltd., boasts a 150-nsec operation that makes the Series 300 as suitable for IBM's relatively fast 3033s as it is for "slower" machines like the 370/158 or 370/168. Thus, the same Series 300 memory board can operate in all of IBM's large-scale processors, the spokesman said.

The price of the Series 300 depends on its configuration. For a typical 3032-type processor, for example, a 3M-byte add-in module costs $56,000.

Deliveries of the LCM Series 300 add-in memories typically take 30 days from Locom at 1500 Norman Ave., Santa Clara, Calif. 95050.

Two OCR Products Join Typereaders

MANCHESTER, N.H. — Hendrix Electronics has added two optical character reader (OCR) products to its Typereader family of page readers, while simultaneously cutting by almost 30% the price of a previous model.

One of the two new offerings, the Model TR3, features recognition of typestyles including Courier 12, Courier 72, Letter Gothic, Prestige Elite, Prestige Pica, OCR-A, OCR-B and Hendrix Gothic. The TR3 reportedly can be configured with up to four styles of type and it automatically determines the style and pitch without operator intervention.

The second new model is the TR2S, which reads OCR-B and Hendrix Gothic types in both 10 and 12 pitch. The TR2S is similar to the price-reduced TR2, except that the latter includes an automatic sheet feeder.

The TR3 costs $18,900, and the TR2S costs "less than $10,000," according to the firm. The TR2 has been reduced in base price from $15,900 to $11,495. Hendrix is located at 670 N. Commercial St., Manchester, N.H. 03101.

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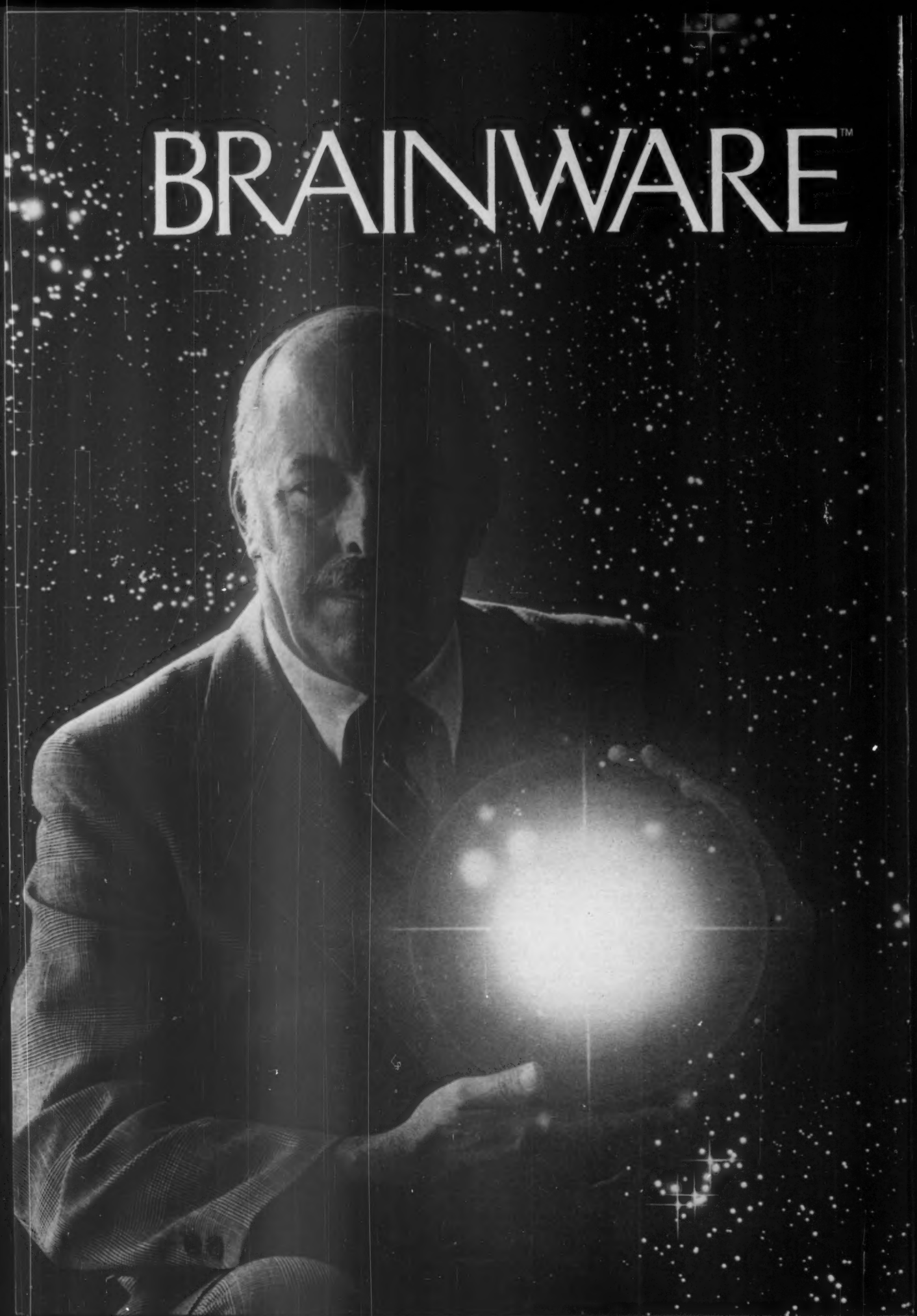

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Winchester, Storage Module Drives Tested

ORANGE, Calif. — Testing and exercising of most Winchester- and storage module-type disk drives is provided by the SX-530 Disk Exerciser, according to its vendor, Wilson Laboratories, Inc.

Pluggable adapter modules permit testing of storage module disk drives of Control Data Corp. models 9448, 9760, 9762, 9764 and 9766; Kennedy Co. 5300; and Trident Co. Series T-25 through T-300.

The SC-530 automatically reads and writes data in five formatted modes using a selection of three data patterns, including data composed by a bank of 16 switches, a 16-bit random data pattern and a cyclic pattern continuously varying throughout the data field, according to the firms.

Self-contained with its own power supply, the SX-530 costs $1,995 including one adapter module.

Wilson Laboratories is headquartered at 2237 N. Batavia St., Orange, Calif. 92665.

Disaster Recovery Tailored

TREVOSE, Pa. — Neshaminy Valley Information Processing, Inc. (NVIP) is offering a disaster recovery service called Safe.

Designed for IBM users, the service is tailored to a company's DP needs. The service will provide both short-term and long-term disaster recovery via time-sharing and shared access facilities. Monthly fees are credited against NVIP's time-sharing capabilities.

With Safe, users can have critical files back on-line in a matter of minutes, the vendor claimed.

Safe costs between $30 and $4,500/mo depending on CPU size and the percentage of backup needed. Peripherals coverage is extra, NVIP said from 4850 Street Road, Trevose, Pa. 19049.

Generator Cuts Power Problems

LOS ANGELES — Sweinhart Electric Co., Inc. is offering Power Conditioning System II, a motor generator that is said to eliminate power-related computer problems.

The product is a second generation of the firm's Isolation Motor Generation Set. It provides protection against all utility and building power problems including sags, surges, spikes, transients and brownouts, the vendor said.

The power generator is available for all computer systems and costs between $9,795 and $39,995, the vendor said from 2900 E. Olympic Blvd., Los Angeles, Calif. 90023.

UPS Controls 60-Hz Output

SAN GABRIEL, Calif. — Clary Corp. is offering a 15-KVA uninterruptible power system (UPS) for computer power interfaces, telecommunications, security, medical laboratory and process control applications.

The UPS features low harmonic sine wave distortion (2.5%) and controls output frequency at 60 Hz (±.5Hz) and maintains voltage to ±2%. The unit includes a static bypass switch with a 4-msec transfer time and is available in a 60-Hz three-phase output or single-phase output modes, the vendor said.

The UPS costs $21,050 not including battery packs from the vendor at 320 West Clary Ave., San Gabriel, Calif. 91776.

Correction

The 4,096-subchannel capability recently announced by Amdahl Corp. [CW, Sept. 29] is available for the 470V/7 as well as the V/7A, V/7B and V/8. In addition, the 470/Extended Performance Accelerator will be available in the fourth quarter of 1980, not 1981, a company spokesman said.

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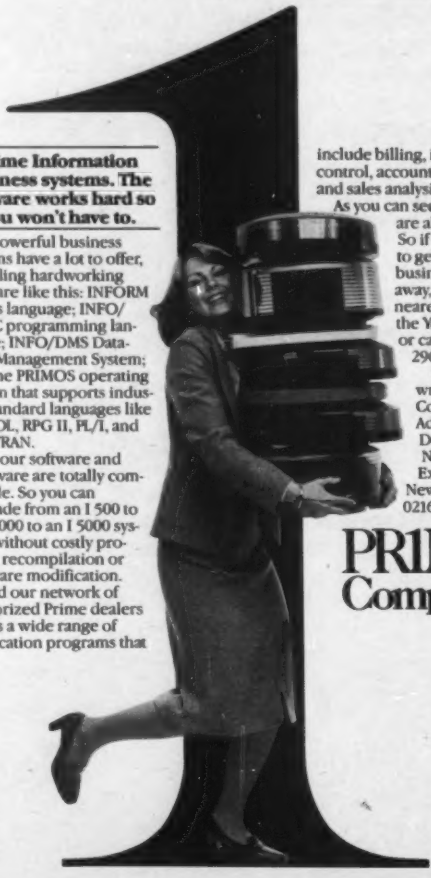
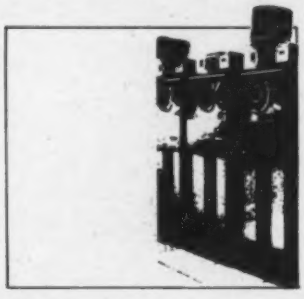


PRIME Computer

Management And Distributed Computing

By Robert W. Shirey



Part 2: Advantages and Disadvantages

"The price elasticity of computation is so great, and the costs of computation are decreasing so dramatically, that the effect is overwhelming to the point where the elasticity effect is no longer noticed in the excitement of chasing opportunities."

— Einer Stefferud, 1978

Most *distributed computing system* (DCS) definitions that we saw in Part 1 talk about *how* a system is built rather than *why* it is built, as if the why were obvious. Most of them talk about features rather than advantages or benefits. An exception is Thierauf's list of seven essential DCS characteristics. He lists four features: three service levels, two processing modes, smart terminals and data base distribution. But he also lists three advantages and benefits: timely reports, ease of use and local autonomy.

Advantages and benefits are the forces behind the creation of distributed systems. Everyone who defines a DCS probably has in mind certain desired advantages and benefits to be achieved by their system. Confusion between features, advantages and benefits causes much of the confusion over DCS definitions.

Features make possible advantages, and advantages can yield benefits. A feature is a part, trait or property — an observable fact. For example, a handle is a feature of a suitcase.

An advantage is a favorable circumstance or means for coping with competition or difficulty. The advantage created by a suitcase handle is that the suitcase can be grasped easily in one hand. A benefit is any valuable, useful or helpful gain, anything that is good for a person or thing. The benefits of a suitcase handle are reduced lifting effort, fewer baggage charges and happier trips for the suitcase owner. Part 1 of this series was about DCS features, but this part lists advantages and benefits.

D'Oliveira analyzed more than 40 case studies to find the forces behind decisions to distribute computer systems [D'0177]. She found three kinds of force:

- **Functional Force.** An advantage that enhances the ability of a DCS to accomplish computing tasks.
- **Economic Force.** An advantage that reduces the cost of accomplishing computing tasks.
- **Psychological Force.** "One whose source is an emotion, a philosophy, a preference, or a perception" of a DCS user, operator or developer.

These three inexact categories overlap. For example, the functional advantage of increased throughput indirectly yields the economic benefit of reduced operating cost. Still, the framework is helpful, and this section uses it to sort out the many publicly claimed advantages and benefits of a DCS.

Functional Advantages

Pyke points out that "distributed computing implies modularity [Pyke 76]." By "modularity" Pyke apparently means that a DCS is planned or constructed in a pattern of standardized parts, using units (modules) that are easily joined to or arranged with other parts or units.

Modularity lies at the root of most of the claimed functional advantages of DCSs. But the modular flexibility of a DCS is a two-edged sword [Sche78]. Almost every advantage listed below can be shown to have a counterpart disadvantage.

Five categories of functional advantages can result from the modularity feature of a DCS. Several authors discuss these advantages [D'0177, Farb74, Jose74, Lieb77, Pard77,

(Continued on In Depth/2)

When building a distributed computing system (DCS), management generalists and computing specialists need to cooperate. But most people are trained in only one discipline, so each group lacks understanding of the other group's role and problems. This series speaks to both groups.

For managers, it explains the distributed computing concept and tells how to make decisions that lead to effective applications.

For technicians, the series reviews themes in management thinking that bear on DCS design, development and operation.

The series, supported by The Mitre Corp., has four parts. Part 1 tells where distributed computing came from and what it is. Part 2 tells what it can do. Part 3 discusses organizational design and strategic planning. Part 4 describes methods for payoff analysis and system design.

IN DEPTH

(Continued from In Depth/1)

Pyke76, Rama76, Sche78, Stat78, Thie78].

- **Greater continuity of service.**
- **Smoother growth.**
- **Better performance.**
- **Easier restructuring.**
- **Simpler development.**

Partitioning, redundancy and simplicity can improve reliability, availability and survivability. System service continuity has three interrelated aspects:

- **Reliability.** Refers to component error rate and failure/repair record.
- **Availability.** Refers to being ready when needed.
- **Survivability.** Refers to robustness when damaged.

DCS modularity has three advantages that can benefit operational continuity:

- **Partitioning.** The natural compartmentalization can reduce the scope of errors, failures and damage.
- **Redundancy.** First, when a module is out of action, remaining modules might be able to do its work. Second, inexpensive, incremental backup is possible. Third, a module can be repaired even while the system runs.
- **Simplicity.** Modules can be individually less complex than a centralized system and have fewer failure modes.

Growth can occur in smaller increments with less disruption. A problem with large-scale, centralized systems is the stepfunction nature of capacity growth, with only large steps possible, accompanied by massive disruption during upgrade and conversion. A DCS avoids the problem in several ways:

- **Smaller Steps.** The finer granularity of growth increments smooths the step-function to match capacity to requirements.
- **Wider Range.** Modularity avoids single-system size and complexity limits, permitting expansion over a wider range of capacities.
- **Limited Conversion.** Older modules and their users are affected very little as new modules are added. Modules can be replaced or modernized individually so that each conversion effort is of easily managed size.

Parallelism and reduced overhead can improve throughput and response. System productivity depends on both equipment performance and user effectiveness. Equipment performance has three aspects:

- **Availability.** The percentage of time the system is available.
- **Throughput Rate.** The volume of work that can be performed during a fixed time interval.
- **Response Time.** The interval between the time an item of work is submitted and the time the system delivers the result.

DCS modularity has five advantages for throughput and response:

- **Local Processing.** Transaction processing at local nodes with local data bases can avoid communication delays and queuing, thus improving responsiveness.
- **Parallelism.** Modular, local processing can improve throughput by exploiting parallel processors. Also, speed can be increased by replacing software with specialized hardware units.
- **Lower Overhead.** The complex operating systems of large mainframes need a large percentage of available computing capacity to manage shared resources, protect multiple users and

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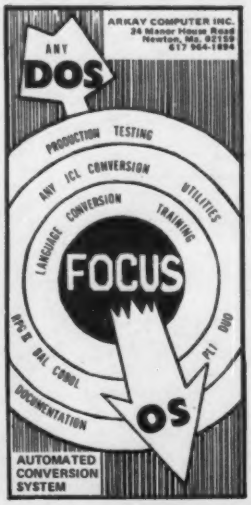

recover from failures.

• **Balanced Loads.** A DCS naturally limits the number of applications per machine, avoiding bottlenecks and avoiding squeezing out low priority jobs.

• **Structured Design.** The mandate to partition in a DCS leads to the use of techniques such as top-down design. Better design techniques can result in better system performance.

Modularity can improve reconfigurability. The functional effect of decentralization can be summed up as flexibility [D'0177]. Another advantage of that modular flexibility is the ability to reconfigure a DCS, either statically or dynamically. A system may be reconfigured to allow growth, to meet new and changing requirements, to balance the work load, to exploit new technology or to bypass failed components.

Systems can be more easily designed and developed. The simpler and smaller machines used in a DCS might require less complex software. This in turn can reduce the costs of design, programming, installation, testing, debugging, tuning, education and other work related to the software. In addition, it might be possible to implement a small pilot or experimental version of a DCS before expanding to a full system. In some cases, just a few DCS modules can realistically exhibit the same behavior as the full system. With large centralized systems, one must resort to simulation.

Economic Advantages

All of the functional benefits listed above can result indirectly in various economic benefits. For example, better throughput implies less cost per unit of work, and simpler development can mean less expensive development and earlier installation. However, distributed computing also produces more direct economic benefits:

- **Reduced communications costs.**
- **Reduced personnel costs.**
- **Reduced duplication of resources.**
- **Reduced initial investment cost.**
- **Increased cost competition.**
- **Economics of specialization.**

Local processing can reduce communications costs. This is one of the most frequently mentioned advantages of a DCS. Computing costs are decreasing faster than communications costs [Stef78]. On-site processing, perhaps using a local data base, can eliminate or greatly reduce communications that would otherwise be exchanged with a centralized processor [Sche78, Stat78, Thie78]. However, this greatly depends on whether data base items referred to in a transaction are found at the module to which the user originating the transaction is connected [Bucc79].

The simple claim here is that the inherent modularity of a DCS reduces communications costs. Feldman reasons in reverse. He says, "A distributed computation is spread among several computers which are assumed to be connected by some communication paths. For the foreseeable future, these communication paths will be less reliable and have lower bandwidth than is available in the processors themselves. This leads us to expect that [distributing computing] programs will be made up of largely self-contained *modules* which will share very little information directly [Feld79]."

Local processing can reduce personnel costs. A DCS can reduce personnel costs by increasing, perhaps dramatically, the productivity of the users, particularly operators of data entry terminals [Do1177]. The productivity gain comes both from the improved system response mentioned above and also from the fact that error correction is much more efficient and effective when it is done at the same place and time as data entry [Thie78].

Sharing can reduce duplication of resources. The need to share resources is a primary reason for computer networking [Lick78]. A DCS can enable local sites to share cooperatively each other's resources and avoid resource replication [Rama76].

Modularity can reduce start-up costs. At first this looks like an indirect benefit that arises because system growth can occur in smaller increments. However it directly affects economic decisions in four ways [D'0177]:

• **Lower Entry Barrier.** Available resources may be sufficient to implement the first modules of a distributed system, but insufficient to install a large centralized system.

(Continued on In Depth/4)

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IN DEPTH

(Continued from In Depth/3)

• **Higher Return on Investment.** Even when sufficient funds are available to build a centralized system, it may not be built because the high initial costs make it compare unfavorably to other possible investments.

• **Lower Decision Level.** In many organizations, spending decisions are decentralized for smaller amounts. So the smaller initial capital requirements of a DCS mean that acquisition is easier at lower management levels.

• **More Alternatives.** The smaller initial investment requirements of a DCS make it a viable alternative to upgrading or expanding a centralized system. Instead, a DCS can be developed in parallel with the central system, and the DCS can absorb both new work and overflows of old work from the centralized system. In other words, "you do not junk your old computer, you merely add some simple inexpensive computers to work with it and lessen its load [Parg78]."

Modularity can increase procurement competition. A DCS can use equipment from many different vendors more easily than a centralized system. This increases the designer's choices and promotes competition between vendors [Pyke76]. It has been shown, for example, that pricing is much more competitive for small business computer systems than for larger, general-purpose systems [Cale79].

Modularity can improve cost-performance ratios. Although a DCS may lose some economies of scale, it gains economies of specialization, what Harold Lorin of IBM calls "economics of dedication." A DCS module can address the immediate needs of a specific user group rather than complex needs of a diverse group [Stat78]. The cost-performance ratio is optimized when the computer architecture matches the application complexity [Sche78]. In a DCS, the match can be made for each module.

Psychological Advantages

Users often seem to accept a DCS better than a centralized system. In addition to the functional and economic factors, four psychological factors are at work:

- **Previous computing experience.**
- **Satisfaction of needs.**
- **Sense of control.**
- **Congruence with organizational patterns.**

Some users have had bad experiences with centralized systems. This is often true in organizations that pioneer and make lots of early mistakes. The users believe that a central system is necessarily unresponsive, inflexible, slow-reacting and expensive. Instead of fixing the central system, they reject it for a DCS.

Modularity encourages tailored services. The modules of a DCS can be application-oriented rather than system-oriented. Information output can be tailored for and delivered directly to the end user [Rama76, Thie78]. Special features can be added to meet immediate local needs [Jose74, Stat78]. In fact, tailored DCS modules can replace or absorb isolated, growth-limited special-purpose systems.

The user has control of the computing resource. Who has control is a powerful psychological issue. To many, having control is more important than getting good service. Of course, having control implies the ability to regulate service quality and other aspects of a computing system [D'0177]:

• **Cost Control.** In a DCS, the local user pays a fixed or closely controlled charge for the local module rather than an uncontrolled variable charge imposed by central management. The user can regulate hardware and software upgrades. Thus, upgrade disruptions are less frequent, and the user does not pay for upgrades that do not benefit him.

• **Priority Control.** The local manager can regulate system response time to match work priorities. He can quickly give one user emergency preference.

• **Security Control.** Does a DCS have better security features than a centralized system? In a DCS, the local user can share data as necessary while protecting the privacy and integrity of the dedicated local node. Some people believe that a dedicated machine implies tighter control of data resources, so they argue that distribution increases security through compartmentation. Others argue that it weakens

(Continued on In Depth/6)

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20 NEXT X
25 M = X - 1
30 M = INT(M/2): IF M = 0 GOTO 107
40 J = 1: K = X - M - 1
50 I = J
60 BEEP 1: L = I + M: IF (A(I + 100)<= A(L + 100))
   GOTO100
70 T = A(I + 100): A(I + 100) = A(L + 100):
   A(L + 100) = T: I = I - M: IF I<1 GOTO 100
90 GOTO 60
100 J = J + 1: IF J>K GOTO 30
105 GOTO 50
107 BEEP 5: INPUT "PRESS ENTER FOR LIST"; A
110 FOR I = 1TOX - 1: J = I + 100: PAUSE "DATA ITEM #";
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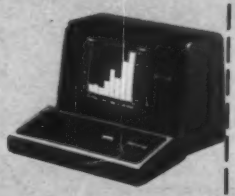

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IN DEPTH

(Continued from In Depth/4)

security by creating too many gates to guard.

The system can be aligned with organizational patterns and goals. Distributed computing makes the local profit-center manager responsible for the success of the local system modules. At the same time, it eliminates most of the political and priority conflicts that prevent a local manager from effectively utilizing a central system. Local optimization is possible, both functionally and philosophically.

Technical Disadvantages

Many of the disadvantages stem from the newness of DCS technology and may yet be corrected. Open issues include: system control, data base distribution, processor architecture and communications media. All of these issues are too complex to survey here. The remainder of this section only tries to define the nature of each problem.

Distributed computing requires more planning and controlling than does centralized computing. "Because minicomputers have miniprices, and often implement applications quickly and painlessly, little attention is given to their widespread implementation in a company or organization until after the fact. Then certain difficult intersystem problems arise that could have been handled had planning entered the process at an early stage [Falo78]." Among the areas that should receive early attention are:

- **Efficiency of information flow and distribution.**
- **Cost effectiveness.**
- **Security/privacy/fraud and abuse.**
- **Standards for data elements and interfaces.**

Component integration becomes the key to successful development when a computing system is distributed. All the modules of a DCS must act as one to serve the end user. Also, the modules must fit together in a maintainable and operable way. As yet, there are no structured programming techniques tailored for DCS development and integration problems.

Data base design might be the most difficult area in distributed computing. A distributed data base has four big design problems [Eckh78, Pard77].

- **Data Allocation.** Where to store data.
- **Query Processing.** How to find needed data.
- **Concurrency Control.** How to keep data synchronized.
- **Security and Integrity.** How to protect data.

The general problem of optimally allocating data among several dispersed processors is one for which the best known algorithms have execution times that grow exponentially with problem size. So, for any significant computing system, optimal data allocation can't be guaranteed except under very restrictive assumptions.

The problem of how to locate needed data is really another allocation problem: where to store the data directory or index. The trade-offs involve access delays and the costs of updates, communications and storage. The choice depends on the number of updates and the number of times a location needs data not stored there. The three basic alternatives are:

- **Partitioned.** Partial, local directory at each location.
- **Centralized.** Full directory at a central location.
- **Replicated.** Full directory at each location.

Concurrency control is the problem of how to keep files and programs synchronized when either a program updates files at more than one location or a file is updated by programs running at more than one location. The solution is to lock — that is, reserve — files or parts of files before updating. How-

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ever, locking leads to the problem of deadlocks between programs and how to prevent, detect and resolve them.

Processor architecture mixes hardware, operating systems and interconnection topology. Most DCS design work to date has probably been devoted to selecting and connecting hardware components. Even so, no dominant architectures have emerged upon which the designer can lean. This is because, first, hardware development will not stand still, so the cost and performance relationships keep shifting. Second, the problem of how to build a distributed network operating system is still a research area. Third, analysis of the properties of interconnection schemes — hierarchies, rings, buses and others — involves combinatorial complexities for which there are no efficient algorithms. It seems safe to say that this area will not be settled for a very long time.

Data communications has matured earlier than other parts of distributed computing. Even though rapid development continues in the fields of data communications, there are already standard international protocols and public utilities. This is because communications media are heavily regulated by governments while management style, data base and machine architecture are not. After the very largest firms enter this market, and after the regulatory structure catches up, the DCS designer will probably find communications to be the simplest area of the four.

Management Disdavantages

The management disadvantages of distributed computing arise from the absence of an omnipotent central authority. Although it is too late to outlaw minicomputers, "distributed" doesn't have to mean "random" [Falo78]. A DCS needs lots of central planning to make effective use of its great flexibility. There are at least five major management trouble areas:

- **Design problems.**
- **Design risks.**
- **Interface problems.**
- **Capacity problems.**
- **Duplication problems.**

Multiple-processor systems are harder to design than single-processor systems. Each individual module of a DCS may be less complex than a centralized system, but a DCS is still collectively very complex. Also, the computing industry has much less experience with the DCS form of complexity. Relatively little software is now available to support distributed computing, and partitioning tasks and files among processors is still more of an art than a science. These are technical design problems also, but the technical work can't begin until after basic management strategy is set.

New technology also has added risk. The advantages of distributed computing are not guaranteed; they are only potentials. A poor DCS design can produce an inflexible and inefficient system that, once it is built, is much harder to correct than a centralized design. Among the design risks are undetected errors or fraud, inability to rebalance after growth and too many different subsystems for the user to remember how to use them all.

There are many more interfaces to match. Distributed computing involves interfaces that previously didn't exist. Technically, for example, computer communications protocols are an active research area. Managerially, most of the interface problems involve relations among multiple equipment vendors in a mixed, dispersed computer/communications environment. Execution of engineering changes is quite difficult, as is assigning responsibility for failures.

Modularity restricts local application size and complexity. Unfortunately, "every industry has a few big jobs that won't fit on anybody's mini [Patr76]." For example, some tasks need large

(Continued on In Depth/8)

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(Continued from In Depth/7)

number crunchers that don't fit easily into the usual commercial DCS design. This problem leads to networks such as the Advanced Research Projects Agency Network, through which users can share specialized equipment.

Decentralization can lead to over-computerization. "The trouble with minicomputers is that they refuse to stay mini; they grow just the way any computer grows [Patr76]." Without centralized management control, distributed computing could lead to uncontrolled growth of local computing empires. The result could be greatly higher total costs resulting from duplication of hardware, software, data, space and people.

Next week: Structure and Strategy.

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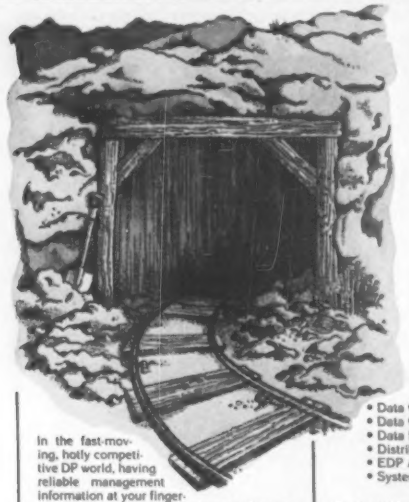

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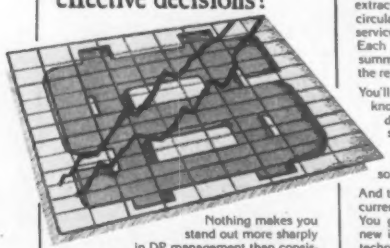

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Dr. Robert W. Shirey is a group leader at The Mitre Corp. in McLean, Va.

Since 1964 he has held positions at the University of Wisconsin's Social Systems Research Center and U.S. Army Mathematics Research Center, The Rand Corp., Computer Sciences Corp. and Booz, Allen & Hamilton.

In addition to his responsibilities at Mitre, Shirey teaches in the Management Science Department of George Washington University.

Shirey holds B.S., M.S. and Ph.D. degrees from the University of Wisconsin at Madison and an M.B.A. from the University of Southern California.

What Management Should Know About IRM

By Theodore W. Ziehe

The United States issued its first patent for an electric motor to Thomas Davenport, a blacksmith from Brandon, Vt., in 1837. Patent No. 132 is for a battery-driven motor that achieves continuous rotation of one set of electromagnets relative to a fixed set by using an automatic commutator switch.

When steam-driven electric generators replaced batteries in about 1870, motors using Davenport's principles became practical and set the stage for the first commercially viable electric motors.

Now, 100 years later, we take for granted an ability to transform electricity and other forms of energy into physical power.

During the 1920s and 1930s the groundwork was laid for another major energy change — transforming electricity into mental power or information. The computer as we know it today emerged during the 1930s and 1940s.

After several decades of limited access to computer-based information, the 1970s brought data base management systems (DBMS) which offer, in a commercially efficient form, combinations of a computer's capabilities for handling data and executing logical processes. During these same years the microprocessor won its place in the market, lowering the cost of processing power. These accomplishments opened the door to the 1980s, a decade for progress in processing information and providing powerful solutions for many kinds of users.

In the wake of these developments, what applications for intelligent electronics are waiting to be uncovered? The potential generates excitement among entrepreneurs throughout the world, and a scramble to discover opportunities is spreading.

As a commercial enterprise, the corporation attracts the interest of many prospectors looking for applications of information electronics. Many corporations have grown by recognizing the significance of information and by meeting primary information needs aggressively, often with ingenuity but at times with brute force or guesswork.

A brute force that many organizations made in recent years was to enormously expand their capacity for processing data. Facilities to compute, process and communicate data are now installed in virtually all large and medium-sized organizations and in many small ones. Yet it is not uncommon for an organization to be swamped with data, while the information necessary to the ongoing success of the enterprise, to the well-being of its employees or customers, or to the preservation of the environment remains unavailable or too costly to deliver.

Once a data processing facility is in place and working, proliferation of hardware and software develops an inertia of its own. With the achievements in microelectronics during recent years, this proliferation is accelerating at an increasing rate.

Organizations on this treadmill have a difficult task before them. They must move from processing data to producing information.

The answers to some key questions are revealing:

- What information is needed? In what context and medium? Who needs the information? When?
- How do people and the DP facility work together to produce the information needed? What part can be automated? What role do people play?

There is no formula, no fail-safe procedure for making the transition. Each organization is unique and must consider different factors. The point of this article is that the transition can be made without overdoses of hardware, software or data specialists of one kind or another — that information can be managed so as to eliminate excesses of data litter.

To move an organization from processing data to producing information requires action on two fronts:

- Upper management, in fact all of operating management, must commit to do it and make the adjustments required.
- The planning function, appropriately chartered, must determine how to do it and see that it is done.

Information resource management (IRM) is a suitable label for this kind of action program.

Management Commitment

The commitment required of management is sometimes characterized as "recognizing that information is a resource." Finances, people, raw materials and capital equipment are some of the resources management commonly deals with. The information resource is often overlooked in preparing for success and working to achieve it.

Information *is* a resource and the business itself is the process that converts this resource into assets. Operating management is responsible for that conversion, and each manager must know the information requirements of his position. Each manager should be

(Continued on In Depth/10)

IN DEPTH

(Continued from In Depth/9)
asked what information he needs to get his job done. This is essential in converting to the idea of information as a resource.

In addition to knowing what information is needed, each manager must recognize the nature of the information required, be it facts and evidence, an estimate based on facts or a judgment based on experience. Does the requirement call for details or a summary? For a summary or an estimate, what range of facts is needed?

These considerations help clarify which sources to tap to meet the information requirements. Data litter may result from an ill-advised application that uses too few facts to produce summaries or estimates, when a judgment based on experience is required.

Such misguided attempts to meet requirements for information are revealed by another test of an organization's commitment to manage the information resource. This test involves the organizational structure used to capture, produce and use various types of information.

This test can be compared to the approach an organization uses in money management. Typically, money is divided on a percentage basis among functional areas such as cost of sales, marketing and research and development. Expenses are also distinguished by type such as personnel, travel, facilities and raw materials. Such structures reflect the organization's goals and macro-conditions. Managers use this structure to prepare budgets and to make decisions about particular expenditures.

A similar need for structure exists in the case of producing and using information. First-line managers must gather facts and report them. Many summaries, estimates and projections can be done best, or only, by using the computer. Judgments, while they may benefit from computer-produced information, can rarely be replaced by the results of a computer-based process.

Briefly, an organization's culture and operating structure express its commitment to information as a resource. Fact-gathering and judgment-making are important parts of information production that have their proper place with computer-based processes. All information, of whatever type, should be significant to some activity. Organizational structures and processes either facilitate or hinder the availability and proper use of information.

Planning Commitment

The second aspect of IRM is planning. Management's commitment to information must be expressed in terms of the specific events and processes needed to satisfy requirements for information formation and use. This requires an integrating approach throughout the organization and applications of electronic media — uses of computers and various types of information appliances — wherever appropriate, but only where appropriate.

The charter of the planning function must support its goal to provide high-quality information — that is, data provided in a meaningful form and context, when and where it is needed, using means that are practical and cost effective. The planning function's scope encompasses the art, or science, of organizational management and a blend of overlapping technologies related to data, image, voice and text processing.

The primary means used to span this scope and to achieve the goal is easy-to-use software that provides information solutions for nontechnical end users. A secondary means is to use specialized hardware devices that plug into the processing facility.

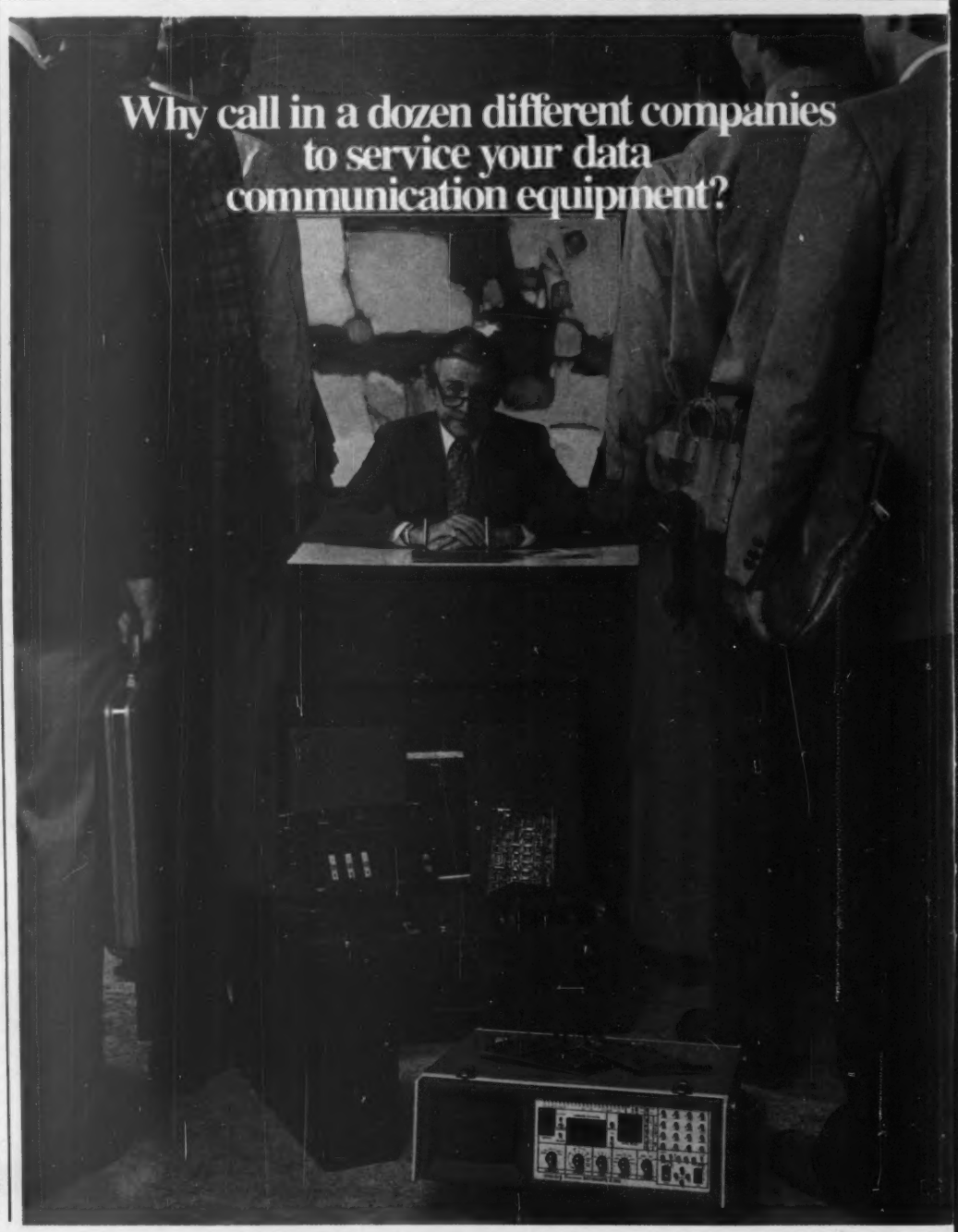
Central Issue

Within the goal, scope and methods provided, planning resolves the central issue of IRM: what data to put into a computer-based repository and how extensively to relate the data deposited there. Resolutions of this issue must take into account three dimensions of an organization's operation:

Functions: what data to include from the organization's various functional areas.

Time: what data to include related to past achievements, present actuals and future plans/forecasts.

Level of Detail: what detailed and explicit data to include, vs. data summa-



ries and combinations for particular purposes.

To interrelate data within computer-based devices, the computer itself becomes an accomplished data manager. Increasing the diversity of records and the richness of associations makes this automated facility more and more "knowledgeable" about the business.

A decision to create a computer-based pool of knowledge about the business, or just one aspect of the business, raises a series of questions about what processes must interface with the pool. For example:

Application Processes. The integrated data base is used to support particular application processes instead of each application maintaining its own separate files of data.

Distribution Processes. Data communications facilities are interfaced to the data base, making it possible to acquire data from, and distribute it to, geographically distant points.

Information Processes. By drawing on the data base, the computer performs various information formation and presentation processes, some of which cannot be carried out practically in any other manner.

User-Interface Processes. To give people ready access to the pool of knowledge about the business, the computer facility interacts extensively with people, not only in the form of data exchanges, but in situations that require the system to handle text, voice and image impressions.

Documentation/Control Processes. The repository of data is expanded beyond knowledge of the business to include data about the repository itself and the processes and people that use it.

Planning should consider and resolve these various aspects of information processing to create an integrated data base for the business.

Drawing Up Plans

A plan for IRM begins with a statement of information requirements. This statement has its origins in the goals and objectives of the organization, just as the allocation of expense dollars must be consistent with organizational goals and objectives.

The statement cannot anticipate every need for information, because many needs are ad hoc. It can identify a body of primary needs and specify information that meets those needs. These specifications indicate the nature of the information, distinguishing among:

- Facts, or evidence, and who supplies them.
- Summaries, or results of other computational processes, and what processes are used.
- Judgments and their computational support.

The specifications also describe the organization's operational structure — the events and processes that produce and use the body of primary information. Finally, the specifications define the composition and capacity of the data processing facility required.

Change Through Software

Typically, organizations move into information resource management through evolutionary changes in their commitments to data processing. Planning determines what changes are required and when. Software is an efficient way to effect many of the necessary changes.

Joseph Ferreira has identified some characteristics of the processing environment that distinguish IRM as a discrete stage in the handling of data (IRM: An Evolutionary Mosaic, *Infosystems*, Vol. 26, No. 10, October 1979, p. 86):

- Information resource systems will be opportunity-driven, rather than technologically or functionally driven.
- They will be user-dominated, not user-oriented.
- They will be dynamically structured, rather than rigidly (system) structured.
- They will be administratively constrained, not technically limited.
- They will be result-oriented, not process-oriented.

Taken collectively these characteristics suggest a radically new way of regarding data, and changes made to the data processing facility must support this new view of data.

A DBMS provides many of the necessities for managing information resources:

- Language for data definition.

(Continued on In Depth/14)

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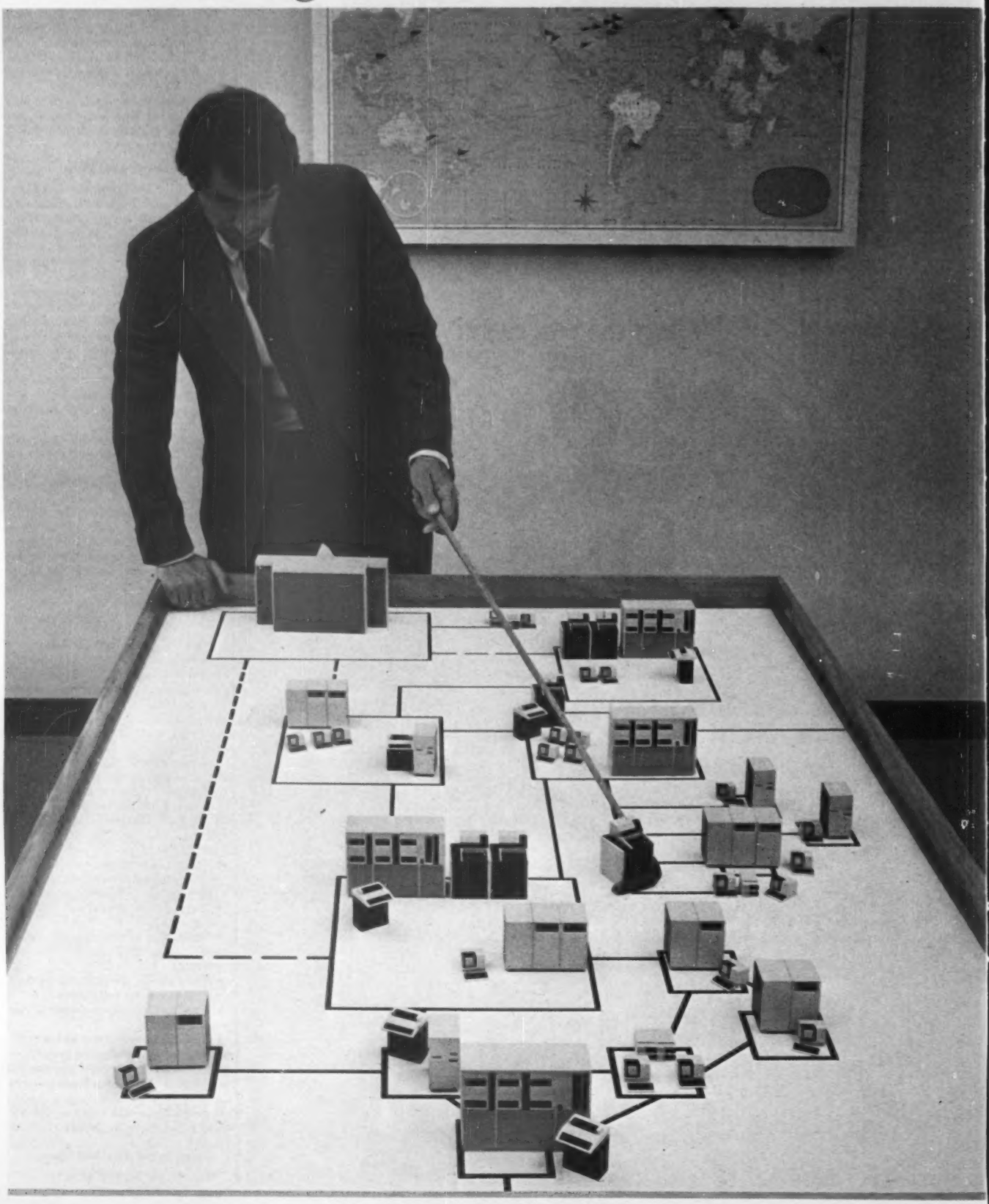
DEC Datasystems. How to gain the benefits of distributed computing without losing control.



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IN DEPTH

(Continued from In Depth/11)

- Facilities for acquiring and storing data.
- Data model for integrating applications.
- Facilities for ad hoc browsing in the data base.

A second important software package is a data dictionary and directory. Closely integrated with the DBMS, this package is used to document and control the information resource, to monitor data uses and users and to analyze the impact of change.

Solution software is a third important type. These packages are ready for nontechnical users, interface directly to the data base and provide processes and processing options for such varied applications as order entry, OEO reporting and production line balancing.

A fourth type of software provides aids for information system development. Tools for designers, programmers and administrators help to define the role the computer will play in information formation and communications processes. Beyond the initial development effort, these tools are used to make system revisions and extentions; to audit system operations, monitor performance and balance the use of resources; and to attend to troubleshooting when problems occur or to error correction when a problem has been isolated.

'DBMS (at the functional level) and microprocessors (at the cost-of-performance level) have filled the void into which MIS fell. Successes denied MIS can now be achieved.'

Other types of software important in information processing are interfaces between the data base/DBMS and the data communications facilities, existing applications software, software utilities and user interface software and hardware devices such as plotters, graphics terminals, and text, voice or image processors.

In the 1960s the management information services (MIS) function undertook to supply the information that management requires. That is also a main theme today in information resource management — but only one theme among several. The multiple themes are appropriate because information for managers must be formed using a broad base of data from various parts of the operation.

MIS was visualized as a computer-based system for producing information. Such systems are an important means for achieving the goals of information resource management — but an appropriate joint effort between people and computer systems is more important. For example, an interactive decision-support system is the IRM equivalent of what an MIS was touted to be — a system that made answers available at the touch of a key.

MIS set out to achieve a goal before the groundwork for achieving that goal was adequately in place. MIS literally repeated the experience of Thomas Davenport. He had a worthy goal — to develop an improved source of power. The engine he developed in pursuit of that goal was an advance, but fell short of success because the source of electricity was not commercially suitable. Steam-driven electric generators solved that problem — but after Davenport's time.

DBMS (at the functional level) and microprocessors (at the cost-of-performance level) have filled the void into which MIS fell. Because that void has been filled, successes denied MIS can now be achieved.

However, one important issue is still unresolved. It relates to our incomplete understanding of the origins of information. But being realistic about the limits of our knowledge on that subject guides planners to an appropriate balance between people and computers in processes that form information.

While the 1880s was a decade of progress in the history of motors, the 1980s will be a decade for progress in the history of information processing. Some major technical issues have recently been resolved. The issues now are human ones — an adequate commitment to progress and the insight that progress requires.

The need for insight related to this matter was accurately perceived in 1810 by Goethe:

"The modern age has a false sense of superiority because of the great mass of data at its disposal. The valid criterion of distinction is (not the quantity of data available but) rather the extent to which man knows how to form and master the material at his command."

The commitments that information resource management requires must come from the top levels of management in an organization. Those commitments are properly based on three insights:

- Skillful use of information as a means of improving work and production processes.
- Computers together with specialized machines, software and related technologies offer opportunities for providing information not otherwise practical.
- Communications processes in which computers participate are not likely to be improved if the attempt to do so is based on intuition or on superficial judgments.

Today's computer technology requires a reorientation to organizational planning and operations, to information and to managing the data, the machines, the people and the processes involved in forming information and communicating it to appropriate points throughout the organization. This new orientation is the essence of information resource management.

Theodore W. Ziehe is director of planning for Intel Systems Corp., a subsidiary of Intel Corp., Austin, Texas.

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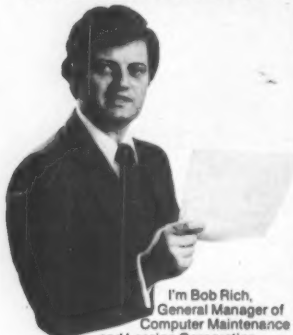

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Formation Offers Planning System For Manufacturers

MT. LAUREL, N.J. — Formation, Inc. has introduced a resource planning system for medium-sized manufacturers that it said not only tracks present production and inventory operations, but can be used to project future materials and equipment needs.

The Forman manufacturing resource planning (MRP) system runs on the firm's F/4000 32-bit minicomputer, introduced earlier this year. Unlike most other MRP systems, Forman offers on-line, real-time transaction processing which allows the manufacturer to update the company's entire MRP file with each data entry.

The system's closest competitor is a configuration offered by Scientific Time Sharing Corp. that is said to cost nearly three times as much as the Formation system.

Typical Forman

A typical Forman system includes the 32-bit F/4000 minicomputer with 512K bytes of main memory, two 70M-byte disk drives, a magnetic tape drive, printer and operator's CRT terminal console. The system can also be expanded to handle up to eight disk drives for a total of 560M bytes of data storage.

(Continued on Page 84)

Mini Screens, Tests Engines For Space Shuttle Flights

Special to CW

NSTL STATION, Miss. — When the U.S. astronauts begin commuting on the Space Shuttle sometime next year, they will be propelled by rocket engines that have been screened by computers and virtually been to the edges of space and back.

The three 512,000-lb thrust Space Shuttle engines are currently being tested at the National Space Technology Laboratories (NSTL) here by Rocketdyne, a division of Rockwell International. The tests involve checking hundreds of individual parameters — from the rate of fuel flow to the timing between the opening of one valve and the closing of another — and generate millions of bits of data, an NSTL spokesman said.

All of this data is processed and analyzed by four complete Data General Corp. minicomputer systems located at the space laboratory.

Under a contract with the National Aeronautics and Space Administrations and the Marshall Space Flight Center, Rocketdyne puts the engines under a wide variety of environmental extremes. These extremes are necessary because of the wide range of temperatures and pressures that will be impacting the engines during an actual space flight. For instance, the rocket's liquid nitrogen fuel clocks in at minus 423°F while the exhaust flames push the mercury to 6,000°F, the spokesman noted.

Two-System Arrangement

The DG minicomputers used by Rocketdyne are arranged in two systems. The first system consists of two Eclipse S/130 computers and is used for redline or maximum value calculations. It is this system that determines how far an engine can be pushed before it reaches a critical stage of operation.

During testing, the redline system continually analyzes data of various previously set performance limits and watches for hardware failures, the spokesman explained. The system is also occasionally used for post-test data analysis.

In the second system, an Eclipse S/130 minicomputer is used as a data acquisition processor (DAP) and does the main body of after-test analyzing. This system is backed up by two Nova 4/S computers that are positioned directly at the engine test stands and used for additional data collection.

Peripheral equipment includes DG dual-density magnetic tape drives, Dasher CRT terminals and hard-copy printers, dual-density diskettes and a number of hard disk drives, the spokesman said.

Prior to using the DG computers, testing events were recorded on strip charts which were manually examined after each test phase. The manual methods were replaced because time interval measurements between events were usually cumbersome and subject to error, the spokesman added.

'Roadmap' Used

Because of the complexity of engine testing, the engineers use a special configuration control document called a roadmap. The roadmap, which is stored in a DG Model 6070 20M-byte cartridge disk, contains information describing how the mea-

(Continued on Page 84)

Prime 50 Gets GCR Tape System

NATICK, Mass. — Prime Computer, Inc. has announced a 75 in./sec group code recording (GCR) tape subsystem for its 50 series of general-purpose systems. The Model 4550 magnetic tape unit allows Prime users to record information at 6,250 bit/in., approximately four times the density previously available, Prime said.

The 4550, which operates at 75 in./sec, can process information in both 6,250 bit/in. GCR format and 1,600 bit/in. phase-encoded (PE) format, preserving compatibility with other tapes and with tapes recorded on systems without the GCR feature, a spokesman noted.

"Data reliability is achieved by the error checking feature of GCR technology as well as the vacuum column transport which ensures the integrity of the tape media, even during high speed rewind when vacuum and capstan control are maintained," he added.

The 4550, which can be configured with all members of the 50 series family of processors, will be available in early 1981. The subsystem, including controller, transport, formatter, cabinet and cables, is priced at $49,500. Additional units (transports, cabinet and cables) are available at $24,500.

Prime is in Prime Park, Natick, Mass. 01760.

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Mini Screens, Tests Engines for Space Shuttle

(Continued from Page 83)

surements get to the recording system from the engine.

For a single-engine test, the roadmap describes the paths and connection points of 400 to 500 channels, and for the three-engine test stand of the main propulsion test unit, up to 1,000 channels are used.

The roadmap contains data reduction information such as equations and calibration data used for engineering display programs. This allows the conversion of the raw data or analog signals into engineering units. In addition, the roadmap describes the individual sensors, where they are mounted on the engine, and what the redline limit is, if any.

The crucial redline information is provided by up to 60 channels, depending on the type of test. Should the redline limits be exceeded during a test, the engine and facility systems are safely shut down.

CSVD System

A Computer Set Voting Device (CSVD) is a major piece of instrumentation that uses the Eclipse S/130 computer-controlled acquisition system. Rocketdyne built the system to compare measurements to set values. Any time the measurement exceeds the set value, a cut- or shutoff is produced.

Within the CSVD system are hardware comparators. The analog voltage set limit is compared against the measurement with a digital analog converter (DAC). Redline values are fed into the DAC by the Eclipse S/130-controlled acquisition system.

During the test, analog signals are sampled at a rate of 10 KHz. The CSVD has an analog and a digital read-back capability to the computer so that the computer can check the values it has set up.

Off-Line Duty

In addition to setting up and monitoring the CSVD system, the computers do off-line duty with data processing tasks. For example, the Measurement System Analysis data is put on magnetic tape and processed by computer to see how the measurement system is performing.

Another computer check involves the Flight Readiness Test, which plots engine valve positions and other parameters. This is done from magnetic tape and read into the Eclipse computer.

Wang's New 2200 LVP: The multi-user computer that stands alone.

In its under-$20,000 price range, Wang's new 2200 LVP computer outclasses the competition with a unique combination of:

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Formation Offers Planning System

(Continued from Page 83)

The system features MRP software that is transaction-driven and therefore updated on a real-time basis. The F/4000 is an IBM 370-compatible machine which allows the user to select from a vast library of IBM programs that do not have to be altered to run on the computer.

The MRP software — which runs under the system's VM/370 operating system and RTMS data base and transaction management system — is modular in nature, the Formation spokesman explained. It was also designed to be used by the non-DP executive, incorporating a training mode that allows the user to access the data base without disturbing the operations at other terminals, the spokesman explained.

The system is said to handle capacity and materials requirements simultaneously and enables users to review the impact of schedule changes on material availability and resources. For instance, if a manufacturer receives an order for a certain product, the system can determine each day if enough materials are on hand to complete the job.

The system's perpetual inventory feature and cycle counting capability is reportedly accurate about 95% of the time and offers a more cost-effective alternative to semiannual or annual "wall-to-wall" inventory techniques, the spokesman observed.

Other features of Forman include online editing for immediate error detection and correction, a security and control system and an audit trail that allows the user to trace changes in data and protect its integrity.

Shipments of turnkey Forman systems and Forman software will begin next month. The software will not be sold to run on computers other than the F/4000, the spokesman said.

Additional details on the MRP system can be obtained from Formation at 823 E. Gate Drive, Mount Laurel, N.J. 08057.

Office Meets Begin Oct. 15

WASHINGTON, D.C. — Micronet, Inc.'s "Paperless Office" demonstration facility here will be the site of two-day office automation workshops beginning Oct. 15, Nov. 12 and Dec. 10.

The training program was designed for automation planning teams, managers of records, information processing and systems designers, as well as executives interested in obtaining an understanding of the impact of automated technologies on industry and government.

The workshop costs $395, which includes lunches, a hands-on demonstration and all materials. Additional information is available from Judy Taylor at Micronet, Inc., Watergate Mall, 2551 Virginia Ave., N.W., Washington, D.C. 20037.

DG Slates User Courses In Four Areas

WESTBORO, Mass. — Data General Corp. is offering user education courses in four regional centers throughout the U.S. between October and March.

With the exception of the Northeast Education Center in Southboro, Mass., which will provide hardware and software classes, only software classes will be offered.

The Southeast, Midwest and Western education centers are located in Norcross (Atlanta), Ga., Arlington Heights (Chicago), Ill.; and Los Angeles, respectively.

Focus on Minis

Focusing on minicomputer systems, the software classes include preparatory, operator training, language extensions and implementation, systems programming and advanced topics. Most of the classes last for five days and cost $675.

The hardware courses in the Northeast include preparatory, processor familiarization, processor maintenance, peripheral familiarization and advanced topics. Prices for these classes vary somewhat, with most costing between $500 and $750 and being offered over a three to five day span.

As with the software courses, frequently there are prerequisite courses that must have been completed before entering classes.

Each training credit earned with selected initial software licenses or software service packages is valid for one year in exchange for one student-week of software training at any DG education center.

Training credits may also be used to reduce the cost of a software on-site course — each one is worth $475 for this purpose.

More information, may be obtained from Linda Spinney or Kathy Shea in the Northeast at (617) 485-7270, Dan McGowen in the Midwest at (312) 364-3045, Bill Cole in the Southeast at (404) 448-9224 and Mari Schroeder in the West at (213) 670-4011.

Winchester System Emulates RL01 Disks

SAN JOSE, Calif. — A 20M-byte Winchester disk system that emulates Digital Equipment Corp. 3.75 RL01 disks in an LSI-11 microcomputer is available from Corvus Systems, Inc.

Designated the 11L, the plug-compatible disk system has an interface that is transparent to the RL01 I/O drivers and operating system, the vendor claimed, adding that it appears to the LSI-11 bus as a DEC RLV11 controller with 3.75 RL01 drives attached.

Smaller Version

A 10M-byte version of the Corvus disk is also available and serves as a plug-compatible replacement for two RL01 drives. Rack mounting on tabletop configurations is available.

A back-end network option called the Corvus Constellation allows up to eight LSI-11 computers to share the same disk, a spokesman said.

The price for the disk system is $5,950, the vendor said from 2029 O'Toole Ave., San Jose, Calif. 95131.

First Two of Series

Desktop Business Systems Debut

HORSHAM, Pa. — Digilog Systems, Inc. has unveiled the first two systems in a series of desktop computers designed to perform financial analysis, inventory control, order entry and other tasks for businesses with annual revenues from $250,000 to $10 million.

The System 2000 is the mid-range member of the computer line and features 650K to 1.3M bytes of diskette storage, 48K to 64K bytes of expandable user memory and Digital Research, Inc.'s CP/M operating system. Expansion capabilities include up to 5M bytes of Winchester disk storage and the addition of from one to three microprocessors per computer, a spokesman said.

Applications support for the machine provides for accounts payable, accounts receivable, payroll, general ledger, inventory control and order entry.

WP Functions

The 2000 can also be optionally equipped to handle word processing WP functions or can be used in a data communications fashion for remote computing or distributed processing, he added.

The mid-range system costs from $8,500 to $11,995 and is scheduled for delivery in January.

The second system, an entry-level member that will be available the following month, has basically the same attributes of the 2000, but is scaled down for smaller businesses. The System 1000 features a minimum of 325K bytes of floppy disk storage and a minimum of 32K bytes of main memory.

Like its mid-range brother, the 1000 can be expanded to fit user needs, the spokesman claimed.

The entry-level machine also uses the CP/M operating system and can be equipped for data communications chores.

The System 1000 costs from $3,995 to $6,595. Digi-Log Systems, Inc. is located at Babylon Road, Horsham, Pa. 19044.

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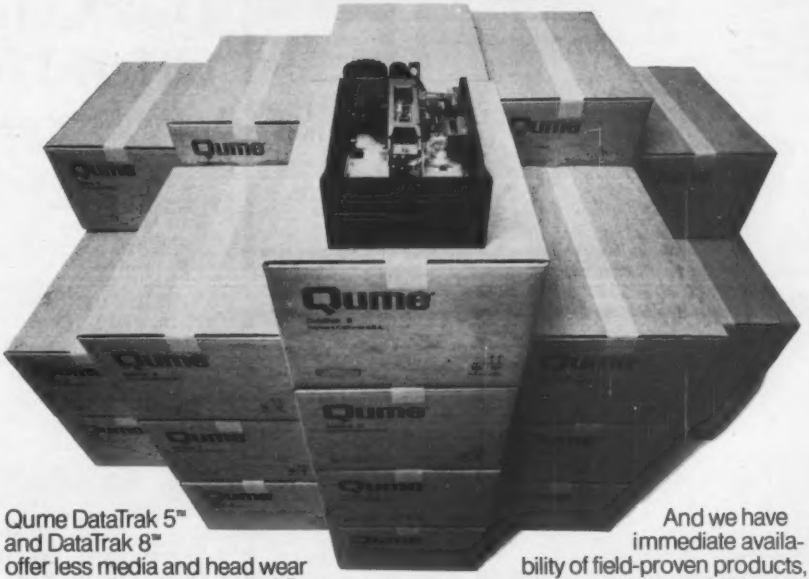

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Durango Line Expanded; Norango Adds Software

DON MILLS, Ont. — Norango Computer Systems, Inc. has announced the expansion of its Durango F-85 business computer line to include the 700 and 800 series, as well as the availability of three software packages and three operating systems for the F-85.

The 700 series — designed for the single user but upgradable for multiuser operation — includes models 710, 720, 730, 740 and 750. The 800 series — for multitasking operations — includes the models 810, 820, 830, 840 and 850.

The Model 710, the smallest model in the Durango family, includes 64K bytes of main memory, a 1,920-char. CRT terminal, a 165 char./sec bidirectional matrix printer and two floppy disk drives each storing 512K bytes. The 710 costs $16,900 (Canadian dollars).

The top of the product line, Model 850, features 128K bytes of main memory, up to five operator terminals supported by full multitasking software and 26M/bytes of file storage. The Model 850 costs $56,500 (Canadian), including five CRT terminals and a printer.

Software Packages

The three vertical market application packages are Star-Text Word Processing, Client Write-Up and Professional Time Reporting. All are operable on the 700 and 800 series of computers.

Client Write-Up is said to allow accountants or bookkeepers to produce a set of financial statements including tax returns for their clients. Professional Time Reporting maintains records of employee activity in order to charge hourly or per diem fees to their clients.

The software ranges in price from $1,000 to $2,500, Canadian.

The operating systems, supporting more than 100 application software packages on the F-85, are the Durango DX-85/M, CP/M and Microcobol.

The Durango DX-85/M is said to allow the F-85 to operate up to five different tasks simultaneously. It functions on the 800 series and supports Star Basic, Durango's proprietary Basic compiler-interpreter.

Microcobol, which includes its own operating system called Business Operating System, contains an interactive text editor and a display mapping feature.

In Canadian dollars, the DX85/M operating system costs $1,500, MicroCobol costs $1,220 and CP/M is priced at $500 from the company at 801 York Mills Road, Don Mills, Ontario M3B 1X7.

Disk Controller, Tape Unit Offered for LSI-11, PDP-11

GARDEN GROVE, Calif. — Distributed Logic Corp. (Dilog) has released a hard disk controller and a magnetic tape coupler for Digital Equipment Corp. PDP-11 minicomputers and LSI-11 microcomputers.

The hard-disk controller will accept up to two 8-in. or 4-in. Winchester-type disk drives. It offers up to 160M bytes of disk storage and tape backup with standard 7- or 9-track IBM, Ansi or DEC-compatible 800- to 1,600 bit/-in. drives with speeds up to 152 in./-sec, the vendor said.

The magnetic tape couplers interface with up to eight common dual-density NRZI/PE formatted magnetic tape drives. The couplers emulate TM-11 and are RT, RSX-11 and RSTS-compatible with software or switch-selectable density controls.

In quantities of 50, both modules — which plug into slots on the DEC CPU — cost $2,972, the vendor said from 12800-G Garden Grove Blvd., Garden Grove, Calif. 92643.

Correction

Computer Products Corp.'s Rimfire 38 [CW, Sept. 22] controls up to four disk drives from Priam Corp., not Prime Corp.

'As I Understand It, Marketing Says It's an Engineering Problem, Quality Control Says It's a Parts Planning Problem, and "60 Minutes" Says It's My Problem.'

Software Investors Hear Good News

By Marcia Blumenthal
CW Staff

BALTIMORE — Investment banking firm Alex, Brown & Sons didn't expect a standing-room-only crowd at its recent Computer Services Seminar here.

But that's just what happened as some 200 venture capitalists and institutional investors stood shoulder to shoulder to hear the good news about the industry.

"The software and services industry has been around 20 years and we are just coming into our infancy," industry toastmaster John P. Imlay, chairman of Management Science America Inc., wryly told the group at lunch.

Infancy or not, the industry is turning a lot of heads on Wall Street, spurring unprecedented interest among institutional investors.

Two-Step Process

The development of a firm in this industry is usually a two-step process, explained Henry F. McCance, vice-president and treasurer of venture capital firm Greylock Management Corp.

Venture capital firms have long invested in software and service firms, but it's taken 10 years for a substantial number of companies to reach the point where they are attractive on the public market, he noted.

In particular, McCance sees

(Continued on Page 94)

Europe, Canada Hit With IBM Price Hikes

ARMONK, N.Y. — IBM raised its purchase, lease and maintenance charges effective Sept. 30 by 5% to 12% in five European countries and by 2% to 17% in Canada.

In addition, services, program products and maintenance were raised 3% to 11%, depending on the country.

The European countries hit by the increases were the UK, France, Italy, Spain and Sweden. The UK and France were subject to increases only for those produts offered by IBM's Data Processing Division (DPD).

Purchase prices increased 5% and lease prices were hiked 8% to 12%, depending on the country.

Purchase prices were raised for the 8100 Information System, the 3800 laser printer, the 3262 and some retail and text systems, a spokesman said. Lease prices were hiked for 370s and 4300 Group I processors (except in the UK), the 8100, 3270 CRT terminals and some industrial systems.

Products from the General Systems Division (GSD) hit by increases were the System/3, System/32 and the 3740.

January Move

Last January, IBM raised prices for DPD and GSD products in most European countries.

In Canada, IBM hiked rental, lease, purchase and maintenance prices for GSD and DPD products by 2% to 16%. Charges for licensed program products and program support were raised 9% to 17%.

Unchanged were prices for the 3380, 3694, 3814 and 5995 and the 4341 Group II. While prices for 30 series processors were not raised, the cost of their maintenance was raised.

Purchase prices for GSD products were not raised, but rental and lease charges for the 5280, 5225, 5250, 5340, 5381 and 5520 were increased.

IBM also raised prices in Canada for GSD products last June and last December for GSD and DPD products.

Says Federal Systems Imperiled

GAO Slams Ruling on DP Services

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Federal computer maintenance and repair is seriously threatened by an industry-disputed Labor Department ruling to place DP equipment services under the Service Contract Act, the General Accounting Office (GAO) said recently.

The GAO report strongly supported the industry position, voiced most prominently by the Computer and Business Equipment Manufacturers Association (Cbema), that maintenance of government DP, telecommunications and scientific equipment should not be subject to Labor-dictated national wage scales.

In June 1979, Labor expanded the 1965 labor law to cover such services, a move the GAO said "is not supported by the act's language or legislative history."

The department "made no feasibility, cost/benefit or impact studies to support its ruling," the GAO continued, saying the ruling "will impose an undue financial and administrative burden on the affected companies" and "may cause federal agencies to eliminate or curtail many crucial programs and services."

The ruling "seriously jeopardizes the nation's defense and security," according to GAO. But the department has steadfastly insisted on it despite industry refusal to enter service contracts under the terms of the act.

The congressional auditors found industry reaction to the act has already caused the Army to shut down a $12 million com-

(Continued on Page 98)

IIA, Commerce Settle Wits Dispute

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — A two-year dispute over a Commerce Department international trade information system is nearing a resolution that one party to the disagreement, the Information Industry Association (IIA), termed "almost ideal."

The IIA and Commerce have agreed on a method to ensure that the Worldwide Information and Trade System (Wits) takes full advantage of the private sector and does not put the government in competition with export on-line data base services already on the market.

Wits, now in a pilot stage linking five U.S. cities and five foreign countries through the Control Data Corp. Cybernet system, will eventually link 47 Commerce offices in the U.S. with its Foreign Commercial Service offices in 65 countries.

Wits provides U.S. exporters with data on foreign buyers and markets as well as export information such as trade show schedules and market research data [CW, Aug. 27, 1979].

The IIA and several of its member companies, including Dun & Bradstreet Corp., lobbied Congress against the early Wits plans arguing Commerce ignored existing information services and would harm U.S. data base vendors by undercutting their sales

(Continued on Page 100)

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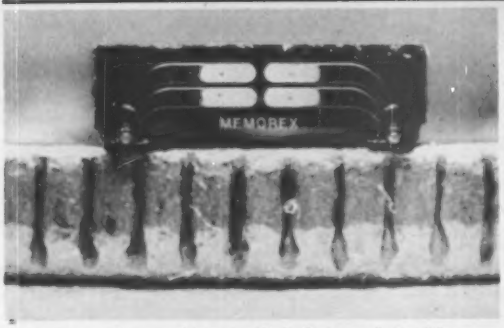

Resting on a dime in this magnified photograph is a Memorex thin-film head for use in the company's new high-performance disk storage unit.

In Wake of STC Offering

Memorex Building 3380 Rival

SANTA CLARA, Calif. — Seemingly out of step with the company's conservative policy on preannouncements of new products, Memorex Corp. recently said it is developing a high-capacity, thin-film technology disk storage subsystem that will compete with IBM's 3380 disk storage devices introduced in June.

The announcement may have been precipitated because of Storage Technology Corp.'s (STC) official introduction of a 3380 comparable product expected later this week, one observer noted.

The Memorex disk drives will be attachable to large IBM 4300 systems, 370 models and Series 30 equipment, Memorex said. Although at the time IBM announced its 3380, company executives hedged on whether Memorex would offer a comparable product, the decision to build the system resulted from a market study performed by the company.

This study projected that on-line data storage capacity in the U.S. is growing at a compound rate of 45% annually. This means that many of the larger computer system users will double their on-line storage every two years.

During the past three years Memorex has intensified its thin-film technologies and has already developed operational thin-film read/write heads, servo heads and matching integrated circuit amplifiers, the firm noted.

To match the performance of its planned thin-film technology disk drive, Memorex is also developing a control unit utilizing state-of-the-art architecture.

Memorex declined to estimate the date of the new disk system announcement.

In the meantime, James Simpson, president of Memorex's Storage Systems Group, said, "We foresee that all customer requirements can be met with our current 3650 and 3652 disk subsystems."

"Because we compete on the basis of service, the Fastrain Printer was the better business decision."

Carlson Marketing and Motivation (CMM) is one of the world's largest premium/incentive organizations. Comprising some six operating companies and providing a very diverse range of services, CMM requires exceptional computer resources. E. C. "Skip" Gage, president and Ed Frandle, director of operations, discuss some of these requirements.

Gage: "We're totally service-oriented, and in the last few years our growth has been almost explosive. Obviously, data processing is a very important part of our delivery system."

Frandle: "Right now we have ten different data centers to serve our clients. We need not only the capacity to handle the volume, but also the flexibility to handle the complexity of our operations. That's why we chose Control Data's 32111 Fastrain printer—it gives us almost twice the throughput of a 1403 and yet it's completely compatible with our hardware and software. The Fastrain even accepts our existing carriage control tapes, so conversion is transparent and painless."

Gage: "We were also impressed by its print quality and reliability. Both were exceptional, given that it operates at 2000 lines per minute."

Frandle: "That's right. In one three-month period, it cranked out more than 60 million lines with perhaps one hour of downtime. I think that's pretty good reliability."

Gage: "We're getting almost twice the speed and print quality that's as good if not better. We're getting service and support whenever we need it. We're getting greater ease of operation and greater ease of conversion. For us, the Fastrain was the better business decision."

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Memorex Forms Media Division From Disk Units

SANTA CLARA, Calif. — Memorex Corp. has formed a Rigid Media and Components Division from its two rigid disk divisions, CFI in Anaheim, Calif., and the Recording Components Division in Santa Clara.

The CFI and Recording Components facilities will both remain in operation in a complementary role.

CFI, acquired by Memorex in 1977, has concentrated on low-capacity OEM products, non-IBM packs and cartridges, while the Recording Components Division has been responsible for high-capacity disk products for all markets.

William P. Sousa, vice-president and general manager of the Recording Components Division, is now vice-president and general manager of the Rigid Media and Components Division. Prior to joining Memorex in 1977, Sousa held executive positions with other computer companies.

Raymond E. Valle, vice-president and general manager of of CFI, will continue as a vice-president of the Computer Media Group and will explore the development of potential activities in the rigid disk test equipment field.

The Rigid Media and Components Division is part of Memorex's Computer Media Group.

Bells Are Ringing for System Maker Formation

By Tim Scannell
CW Staff

MT. LAUREL, N.J. — The first thing a visitor notices upon entering Formation, Inc.'s headquarters here is a shiny brass bell hanging conspicuously from the wall. Placed there as a kind of metallic cheerleader, the bell is rung when computer sales at the firm total more than a million dollars.

Workers at the 10-year-old company are no strangers to the bell's peal; the privately-owned company's latest earnings figures total $20.6 million, with an after-tax profit of $1.3 million.

A relative newcomer to the computer manufacturing playground, Formation sells small to large mutliprocessing systems as well as a variety of peripheral controllers and communications systems. While the firm's most familiar product — and its flagship system — is a more powerful alternative to the RCA Corp. 3301 computer, the company broke new ground earlier this year when it unveiled a 32-bit minicomputer with the processing power of an IBM 370/138 and the ability to run 370-compatible programs.

Formation's officers (left to right): Robert Jenkins, vice-president of engineering; Arthur Beard, president; and Barry Kessler, vice-president of operations.

Humble Beginnings

Formation presently consists of two buildings or 62,000 sq ft of administrative and manufacturing space among such recognizable neighbors as 3M Corp.'s Graphics Division and Okidata Corp., but the company had humble beginnings.

It was founded by Arthur Beard, now Formation's president and chairman of the board, and three other engineers who left RCA in 1970. Beard was employed by RCA as chief engineer of its Computer Systems division and was an engineering manager of RCA's Defense Electronics Products division.

In its first year, Formation was basically a consulting firm operating out of a small office in nearby Cherry Hill, N.J. Working with a limited support staff, the four founders — relying heavily on their RCA engineering backgrounds — consulted for large mainframe users and designed complete systems for other companies.

As the company grew, Formation branched away from just telling customers what to buy and how to arrange it to actually building peripherals. One of its first products was a high-speed controller for Digital Equipment Corp.'s PDP-11/45 that was one to two years ahead of anything DEC was working on, Barry Kessler, one of Formation's founding fathers, said.

CW Photo by T. Scannell

A circuit board for the Flynn computer gets checked out.

The firm's research on peripheral attachments later evolved into the development of the 9903 processor, which established the firm as a full-fledged computer manufacturer. The 9903 is reportedly the more powerful clone of RCA's 3301 computer and is described by Formation as being an IBM 370/158-class machine. Since the 9903's first installation in the spring of 1978, the company has delivered about 26 of these systems and currently has 12 on order.

Throughout its evolution from a consulting firm to a computer manufacturer, Formation focused on developing "customer-responsive computer systems," Kessler said. The company initially concentrated on developing high-speed peripherals for RCA, Hon-

(Continued on Page 90)

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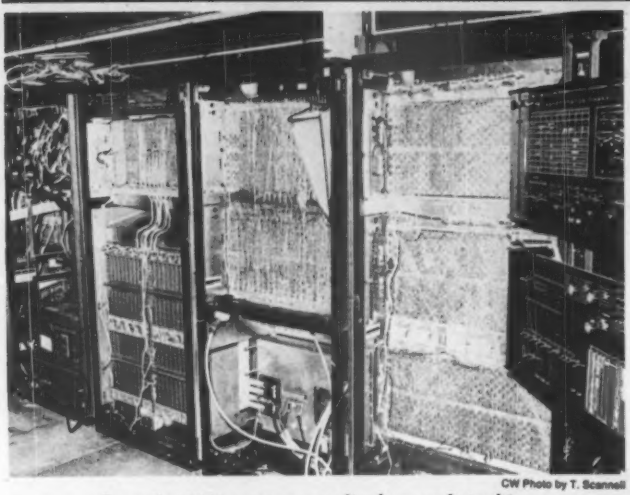

CW Photo by T. Scannell

Formation 9903 processors are lined up, ready to ship.

Formation Continues Quest For 370-Compatible Niche

(Continued from Page 89)

eywell, Inc. and DEC computers. Now, however, the favorite target is IBM and the continued quest for 370 compatibility.

In fact, to further its IBM compatibility research, the company has installed an IBM 370/138 and will shortly have a 4331 processor. The IBM machinery is constantly tested and matched against Formation's own computers for processor performance and program compatibility.

Most of Formation's products were born out of the needs expressed by users who came to Formation to solve their problems, which mainly concerned outdated or inadequate computer systems.

To reinforce its vendor-customer relationship and its claim that customers are actually "partners," Formation never insisted on payment until the product was delivered, Kessler stated. That way, it was "our money up front if something went wrong."

All of the computers and products sold by the firm were designed to ease the user's sometimes rudely awakening experience with computer technology and to go along with the trend of locating a system out of a closed DP shop.

Name of the Game

"The name of the game is not to maximize large systems, but to maximize the efficiency of the operations or office worker," president Beard commented. Formation's current developmental philosophy is make small but powerful computers that are easy to operate. Today, "you just don't have enough programmers to program all the applications and if you did, you wouldn't be able to afford them."

Beard also claimed that the growing number of white-collar workers and shrinking blue-collar force makes it imperative that computers be simple to operate.

About two years ago, Formation decided to tackle head-on the business systems marketplace with a 32-bit minicomputer system, the F/4000. While the system is technically in the same class with other 32-bit machines offered by such firms as Perkin-Elmer Corp. and Prime Computer, Inc., Formation is not riding its system solely on the 32-bit crest. Rather, the F/4000 is being hyped for its 370-compatibility and its ability to take advantage of a circus of IBM-oriented computer programs.

The company's latest product, unveiled at its first press conference here a few weeks ago, is an on-line, real-time manufacturing resource planning system that is based on the F/4000.

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Canadian Volker-Craig Opens U.S. Branch

TORONTO – Volker-Craig Ltd., a Canadian manufacturer of alphanumeric terminals and related peripheral equipment, has entered the U.S. market, opening a subsidiary in Rochester, N.Y.

Volker-Craig expects to generate three million dollars in sales in its first calendar year of operation and 10 million in the second year, according to Robert Abernathy, director of U.S. operations.

M/A-COM to Acquire Two More Firms

BURLINGTON, Mass. – M/A-COM, Inc. has reached agreements in principle to acquire Microwave Power Devices, Inc. of Hauppauge, N.Y., and Power Hybrids, Inc. of Torrance, Calif.

Microwave Power Devices is a supplier of solid-state RF and microwave power amplifiers and related subsystems. Power Hybrids is a supplier of RF and microwave transistor products.

Both acquisitions will be effected by a merger of M/A-COM subsidiaries into the two companies.

Cites 'Incredible Opportunity'

AT&T President Urges Cooperation With Nata

By Phil Hirsch
CW Washington Bureau

HOLLYWOOD, Fla. — The rapidly growing telecommunications market provides "incredible opportunity for all who will participate," AT&T President William M. Ellinghaus said here last week.

Addressing the annual convention of the North American Telephone Association, (Nata), Ellinghaus said "the Bell System has decided . . . there is no part of that industry in which we intend to come in second."

He returned to this theme at the end of his speech and talked about the need for "cooperation" between AT&T and Nata members who manufacture and supply telephone terminal equipment that competes with many Bell products.

Granting cooperation "has not always been the case," Ellinghaus added that Nata and AT&T recently have reached "some important agreements" — notably, a standardized, centralized procedure for handling circuit orders from users of "interconnect" equipment. "We need, and sincerely want, more such points of agreement wherever possible, and toward that end we must keep the lines of communication open."

Additional Controversy

Regarding another point of controversy — the differing views of Nata and the phone company about national telecommunications policy — Ellinghaus, after assuring his audience that AT&T will "abide by both the spirit and the letter of the rules laid down to guide us," said Bell still is uncertain about those rules.

Specifically, there are "numerous points" in the Federal Communications Commission's Second and so-called final Computer Inquiry Decision "we would like to see clarified . . . Moreover, we would like to see Congress speak on the matter, since we feel Congress ultimately would provide the most authoritative and conclusive voice in the establishment of new policy for our industry," he said.

Ellinghaus also said that "our internal deliberations no longer are dominated by the political issues that face our business. Rather, we are concerned these days with organizational and operational matters that will affect our ability to perform successfully in the largely competitive future."

A logical implication of this comment is that AT&T has stopped fighting efforts to promote greater competition in the telecommunications marketplace. It is a point which phone company officials have been stressing recently.

One sign of Bell's acceptance of competition, Ellinghaus pointed out, is the corporate reorganization announced last August. Basically, the company was split into two entities — one concerned with regulated services and the other with the unregulated "competitive" offerings mandated by pending but presently comatose legislation that would revise the Communications Act of 1934.

Further organizational changes are planned within AT&T operating companies which will divide the entire Bell System into separate entities offering regulated and unregulated services, Ellinghaus said. He is in charge of the regulated side of the house, while Vice-Chairman James Olson heads up the unregulated services operation.

Regarding the unregulated subsidiary, Ellinghaus said "we'll be aiming to serve a global information market . . . not just the telephone, or even the telecommunications business, but rather the business of moving information — whether voice, data, graphics, or pictures — from just about any place in this nation to any other, or throughout the world.

"The business of this separated subsidiary, or subsidiaries, will be hardware . . . software [and] systems. Its products will include those developed in its own laboratories and manufactured in its own plants. They also undoubtedly will include those manufactured and distributed by others — like yourselves," he added.

Honeywell Forms Arm For In-House Needs

MINNEAPOLIS, Minn. — Honeywell, Inc. has established a Corporate Information Service Department (CIS) to meet the firm's internal demands for DP and telecommunications.

The department, which reports to Jim Berrett, vice-president of corporate planning, will develop and implement new information services to help increase productivity within Honeywell through the use of computers and telecommunications.

Director of the CIS operation is Joseph Timpe, who will be responsible for the day-to-day operation of the information services. He formerly served as director of corporate telecommunications.

Irma Wyman was named director of CIS development and will be responsible for creating plans for the development of systems and human resources necessary for internal networking, information processing and office automation functions. She was formerly director of Honeywell Information Systems central staff.

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CI Notes

NCR Extends Tender Offer Of Adds Shares to Oct. 15

DAYTON, Ohio — NCR Corp. extended until Oct. 15 its tender offer for the common and preferred shares of Applied Digital Data Systems, Inc. Adds even though 81% of Adds' common stock had been tendered as of Oct. 1, the expiration date of the original tender offer.

NCR said it extended the offer to allow those Adds shareholders who had been hesitant to tender their shares because of two recently filed shareholder suits to take advantage of the tender offer.

The two class-action suits, filed by Martin Lansman and Salvatore and Hilda Laurenzano, charged, among other things, that the $12/share offer for Adds common and $27/share for the preferred satock was "grossly unfair." As of October 1, 4.1 million of Adds common and 70,370 of the preferred stock had been tendered.

To date, NCR has not taken any action relative to the two shareholders suits, a spokesman said.

The proposed acquisition of terminal maker Adds, one of NCR's major OEM suppliers, is also being investigated by the attorney general of the state of New York to determine whether the offer complies with the state's Security Takeover Disclosure Act.

Honeywell, Sesa Join Forces Eyeing U.S. Network Mart

MINNEAPOLIS — Honeywell, Inc. has joined forces with Sesa S.A. to pursue the data communications network market in North America.

Called Sesa-Honeywell Communications, Inc., the Herndon, Va.-based firm is 51% owned by Sesa and 49% owned by Honeywell. Former president of Sesa's U.S. operations has been named president of the new company, a spokesman said.

Sesa, which is headquartered in Paris, has been developing packet- and message-switching technology for Europe including the Transpac public packet-switching network and its new DPS 25 packet-switching system from the European Railroad Association.

In this country, Sesa-Honeywell will market the DPS-25 and an unspecified message-switching system. A spokesman could not give more details on either product.

Xerox Ethernet Patent Available for License

LOS ANGELES — In conjunction with the publication of specifications for Ethernet, a local-area communications network [CW, Oct. 6], Xerox Corp. has made its basic patent for the network, USP 4,063,220, available to all parties for a one-time payment of $1,000 per license.

The single payment will cover any number of local area network products of the licensed companies, a Xerox spokesman said.

All worldwide counterparts of the patent are also available for license. The Japanese counterpart application is available for license from Fuji Xerox. All other non-U.S. counterparts are included in the basic Xerox license.

A second Ethernet patent, USP 4,099,024, that covers an Ethernet repeater is also available for license on similar terms. Ethernet repeaters are used to transmit digital information signals by reinforcing them as they move long distances on the Ethernet cable.

Exxon Corp. Establishes Office Systems Co.

NEW YORK — Exxon Enterprises Inc., the new ventures development arm of Exxon Corp.. has announced the establishment of the Exxon Office Systems Co. to manage business operations serving the office products market.

The new company will consist of QWIP, QYX and Vydec; the Office Systems Marketing Division for domestic marketing, sales and service operations; the international Division; certain Exxon Enterprises staff functions; and advanced product development activities.

Robert A. Contino has been named president of Exxon Office Systems Co. Contino joined Exxon Enterprises in February from the IBM Office Products Division, where he was vice-president of plan and requirements.

Exxon Office Systems Company has chosen Stamford, Connecticut, as its future headquarters. The site in Stamford will be ready for occupancy in summer of 1981.

Manufacturing and product development facilities of the three major product areas, QWIP, QYX and VYDEC, will remain at their respective sites in Orlando, Florida; Lionville, Pennsylvania and Florham Park, New Jersey.

QWIP Systems Division manufactures and markets telephone facsimile transceiver devices.

QYX Division manufactures and markets electronic typewriters which use microcomputer components that can be upgraded by the addition of electronic modules.

VYDEC, Inc., manufactures and markets visual display word processing systems. Text may be stored, retrieved, changed or formatted on the text editor and printed out on a high speed printer.

Supershorts

Signetics Corp. took the first step in a planned $100 million facilities and equipment expansion into Albuquerque, N.M., at a recent groundbreaking ceremony. The initial facility is expected to b· completed in 1982, when productio· of MOS large-scale circuits and bipolar analog integrated circuits will commence.

– – –

Intelsat will buy an additional Intelsat V satellite to provide 12,000 two-way telephone circuits and two TV channels. It can accommodate maritime users as well.

– – –

Daniel Schorr of Cable News Network has been selected as the keynote speaker for Scientific-Atlanta's sixth annual Satellite Earth Station Symposium on Oct. 27-29. A CBS News veteran and current chief Washington correspondent for Cable News, Schorr will address the 600 symposium participants on "The Electronic Media in a Democracy."

– – –

JMR Systems Corp., Derry, N.H., became known as Gentex Electrocoustic Group effective Oct. 1. The voice communications-electronic component manufacturer changed its name to reflect its "broadening corporate identity."

– – –

Former Itel Corp. marketing and software development exec Don Owens has joined forces with Brigham Young University experts to form a new company called Satellite Software International. The new organization will offer a word processing system for use on all Data General Corp. computers.

No

Services Acquisitions Found Heavy

ARLINGTON, Va. — For the first half of 1980 there were 42 merger and acquisition announcements valued at $164 million in the computer service industry, according to the index compiled jointly by the Association of Data Processing Service Organizations, Inc. (Adapso) and Broadview Associates, Inc.

While last year's first half saw 56 such announcements valued at $383 million, two large transactions made up nearly 70% of that total, Bernard Goldstein, a partner of Broadview, said.

These were Dun & Bradstreet, Inc.'s purchase of National CSS, Inc. for $167 million and McGraw-Hill, Inc.'s $103 million acquisition of Data Resources, Inc.

Bolstered Trend

"The trend of such cash-rich corporate giants eyeing the computer services industry is further buoyed by the just announced proposed acquisition of Manufacturing Data Systems, Inc. by Schlumberger Ltd. for $190 million," Goldstein said. This is the largest acquisition ever within the industry.

Goldstein pointed out that the high interest rates during the first half of the year had some negative influence on proposed consolidations. Despite this cash crunch, cash continues to be the major medium of exchange. In contrast with the Adapso/Broadview index, W.T. Grimm and Co. reported 25 announcements in the computer services industry for the first six months of 1980.

Japan to Host Exhibition

TOKYO — The third International Microcomputers, Minicomputers, Microprocessors/Data Communications Exhibition (IMMM/Datacomm) will be held here Jan. 28-31.

According to sponsors at the Kiver Organization, 90% of the available display space has already been reserved.

Details on the show are available from Industrial & Scientific Conference Management, Inc., 222 W. Adams St., Chicago, Ill. 60606.

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Software Market Turning Heads on Wall Street

(Continued from Page 87)

both the packaged software and service sectors driving the demand among investors. Packaged software is now perceived as a tangible product — "you can resell it in volume," he explained.

Moreover, service firms with repeat business are viewed as annuity-producing.

Basic Requirements

Examining the prospect of companies' going public, investment experts generally agreed a firm in the computer services industry must have at least:

- Solid management
- Excellent financial reporting techniques that will stand up to scrutiny by the Securities and Exchange Commission.
- A niche in the market.
- About 20% to 30% growth per year.
- Revenues of at least $10 million to $12 million.
- After-tax profit of $1 million or 10%.

The early to mid-1970s was often called the "software depression" because of the aftermath of an accounting rule change that no longer allowed software companies to carry development costs as assets. As a result, these companies looked as if they were worth very little.

But today, many firms are approaching or surpassing the $10 million to $20 million critical mass requirement.

In the past two years, at least seven firms in the industry have made initial public offerings. Cullinane Corp., which went public in August 1978, was the first exclusively software firm to go public in 10 years.

That well-received offering was followed by Auto-Trol Technology, Informatics, Inc., Triad Systems Corp., STSC, Inc., Applicon, Inc. and American Management Systems, Inc.

And within the next two years probably double that number will go public, Richard L. Franyo of Alex Brown estimated. Sought-after candidates for initial public offerings are Pansophic Systems, Inc., Software International, Inc., Software AG and McCormack & Dodge Corp., among others.

The prices at which these newly public companies are trading is impressive. Applicon made its initial offering in July at $22 per share and on the day of the seminar closed at $48.75.

Success Stories

You need a couple of success stories to drive the market, Alfred R. Berkeley of Alex, Brown noted. Berkeley edits the "Computer Services Monthly," a report sent to more than 2,000 investors.

Within the institutional investors ranks right now, growth company investors are hot on service industry stocks. These investors consider software and service companies good buys because they are not capital-intensive or really very labor-intensive, he explained. "A software business can get a dollar of sales by spending less than a dollar."

And the industry exists because of changes in hardware. With hardware prices so low, the base of users is expanding monumentally. These smaller users cannot afford to hire programmers, so they rely on packaged software products.

Van L. Brady of Presidio Partners based in San Francisco was one of the growth company investment firms listening to the presentations made by executives of 18 industry firms.

Cullinane Shares Snapped Up

WELLESLEY, Mass. — Two years ago, Cullinane Corp. was the first software company to "go public" in 10 years.

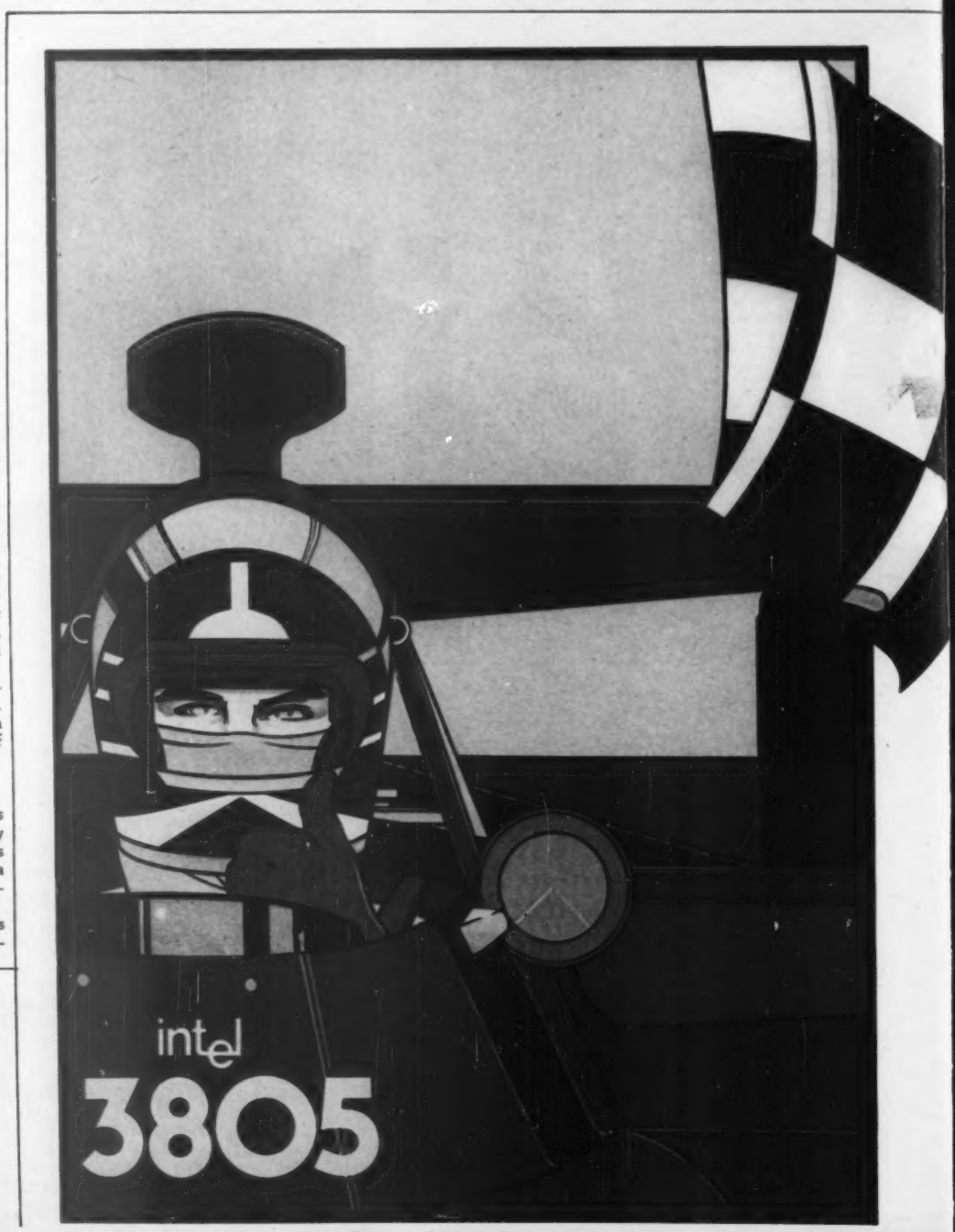
Last month the company went to the equity market again, offering 300,000 shares priced at $53 each. Eager buyers snapped up the shares in 40 minutes.

Cullinane will use most of the $15 million raised to acquire other software companies and application packages, both cross-industry and industry-specific, according to company president John C. Cullinane.

The packages acquired will be integrated with Cullinane's IDMS data base products.

Moreover, the firm is opening an IDMS Data Center, a joint venture with Avco Computer Services. The center will offer services for IDMS users awaiting delivery of a new system or those which have an overload situation on their current system, Cullinane explained.

The center will also offer a Catastrophic Recovery Service. Under this arrangement, IDMS users can store copies of their programs at the center, updating files daily.



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To Ease Trade Relations

Japan's NTT Negotiating With IBM for 5280s

By Marguerite Zientara
CW Staff

TOKYO — In an apparent attempt to solve one of Japan's thorniest trade problems with the U.S., the Nippon Telephone and Telegraph Public Corp. (NTT) recently announced it is negotiating to buy data entry equipment from IBM.

A spokesman for the Japanese government-sponsored concern said NTT "is negotiating with IBM in the direction of buying IBM's 5280 data entry equipment" and is likely to conclude a purchase agreement.

While not specifying the dollar amount involved in the negotiations, the spokesman disclosed that the two concerns are also negotiating on a possible "cross-licensing" agreement. He would not elaborate on the technology that is the subject of those talks.

In Mt. Pleasant, N.Y., an IBM spokesman acknowledged that two sets of unrelated talks have been taking place between the two concerns, but he declined to give details of either development.

By pursuing an arrangement with IBM, NTT apparently hopes to ease U.S. pressure on Japan to open its telecommunications market — estimated at $3 billion in value and dominated by NTT — to competitive bidding by foreign companies.

The IBM 5280 intelligent terminals under consideration would reportedly be used by NTT to calculate telephone charges to consumers. NTT currently uses Japanese equipment for that function.

In the past, NTT has argued that foreign-made equipment generally is inferior to its domestic gear. But in the aftermath of its potentially far-reaching policy change, NTT said it made a "comprehensive assessment" of the IBM equipment and found it "technically superior."

In the event an accord is reached, delivery could begin as early as April. The companies are said to be talking about an initial purchase of about 40 sets of the equipment, although the exact quantity is a point of negotiation. NTT might subsequently buy an additional 400 sets within several years, observers noted.

The NTT/IBM talks have been underway for three months. While IBM reportedly proposed similar contracts 10 years ago, the Japanese firm did not accept the offer at that time, according to NTT.

If completed, the transaction could have wide implications for U.S. manufacturers of semiconductors, computers and telecommunications equipment in Japanese markets.

Besides their business significance, however, the new developments appear to have even more political and diplomatic meaning. They came as U.S. trade negotiator Reubin O. Askew and his Japanese counterpart, Saburo Okita, prepared to meet in Washington to discuss the NTT controversy.

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Native Mode utilizes Fixed Block Architecture—a simple and highly efficient addressing scheme—which further increases the semiconductor disk's already exceptional performance. Data transfer is started with a sequence of only two commands (in contrast to six commands for a rotating disk).

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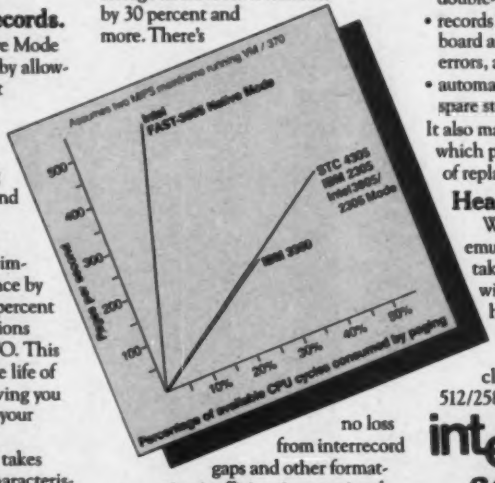

no loss from interrecord gaps and other formatting inefficiencies associated with rotating disks.

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HP Takes Option On Plant Land

PALO ALTO, Calif. — Hewlett-Packard Co. said it has obtained an option to purchase 315 acres in Longmont, Colo., as a site for a future electronics plant and also announced plans to begin start-up manufacturing operations in a leased facility near Lake Stevens, Wash., by the summer of 1981.

W. Bruce Wholey, HP vice-president of corporate services, said the Longmont property, if purchased, will be used to accommodate long-term expansion from the company's Loveland, Colo., Instrument Division.

He said the property "probably will not be developed for several years."

Expansions

Other Moves

Electronic Data Systems Corp. has leased a 33,660 sq-ft building at 9085 Aero Drive in San Diego Business Center to house its check processing center. Occupancy is expected in November.

NCR Corp. has announced plans to construct a 96,000 sq-ft addition to the company's engineering and manufacturing facility in Wichita, Kan.

Datamedia Corp. will expand its operations with a move to a larger building at 7401 Central Hwy. in Pennsauken, N.J., on Oct. 11.

See page 135 In Buy/Sell/Swap

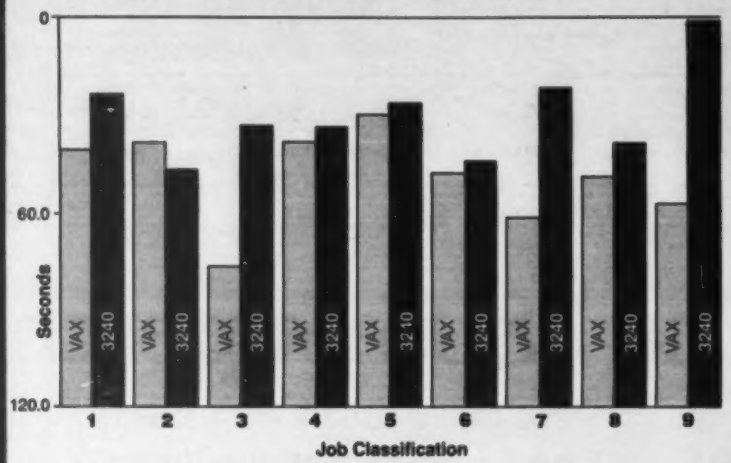
The benchmarks prove it...

1. Performance Measurements

Benchmark Name	VAX 11/780 CPU time	Perkin-Elmer 3240 CPU time	Performance Ratio*
PMS0154	1.140	0.907	1.26
PMS0254	4.710	4.485	1.05
PMS0354	9.160	8.990	1.02
PMS0454	43.610	43.451	1.00
PMS0554	86.420	86.123	1.00
PMS0664	1.610	1.350	1.19
PMS0764	7.040	6.679	1.05
PMS0864	13.730	13.370	1.03
PMS0964	66.830	66.068	1.01
PMS1064	132.920	129.727	1.02
PMS1124	1.520	1.306	1.16
PMS1234	2.470	2.424	1.02
PMS1324	1.310	1.618	0.81
PMS1407	251.560	37.327	6.74
PMS1507	50.260	57.657	0.87
PMS1674	22.440	23.005	0.98
PMS1724	52.550	53.133	0.99
PMS1807	50.180	34.766	1.44
PMS1907	32.020	34.679	0.92
PMS2007	17.720	20.264	0.87
PMS2107	13.450	20.242	0.66
PMS2202	33.311	26.352	1.26
PMS2324	121.610	137.997	0.88
PMS2402	0.940	0.539	1.74
PMS2502	0.720	0.562	1.28
PMS2624	122.920	227.689	0.54
PMS2708	4.850	0.961	5.05
PMS2809	103.770	0.006	17295.00
PMS2934	0.660	0.414	1.59
PMS3009	0.230	0.006	38.33
PMS3103	0.610	0.398	1.53
PMS3202	4.740	3.923	1.21
PMS3307	2.470	1.959	1.26
PMS3407	39.190	7.774	5.04
PMS3507	5.580	2.587	2.16
PMS3607	156.540	20.077	7.80
PMS3701	4.480	1.621	2.76
PMS3802	4.060	2.874	1.41
PMS3903	6.050	3.864	1.57
PMS4002	9.330	5.505	1.69
PMS4102	76.290	77.764	0.98
PMS4202	118.490	125.039	0.95
PMS4301	110.650	75.569	1.46
PMS4403	1.990	0.739	2.69
PMS4584	219.990	189.081	1.16
PMS4603	18.640	16.939	1.10
PMS4701	0.350	0.077	4.55
PMS4802	0.830	0.880	0.94
PMS4934	0.340	0.050	6.80
PMS5008	0.430	0.168	2.56
PMS5108	98.950	55.419	1.79
PMS5208	0.900	0.917	0.98
PMS5308	0.330	0.029	11.38
PMS5408	2.080	1.697	1.23
PMS5502	1.130	2.180	0.52
PMS5602	207.140	198.685	1.04
PMS5703	585.170	254.545	2.30
PMS5824	18.740	18.194	1.03

*Performance Ratio = $\frac{\text{VAX 11/780 CPU time}}{\text{Perkin-Elmer 3240 CPU time}}$

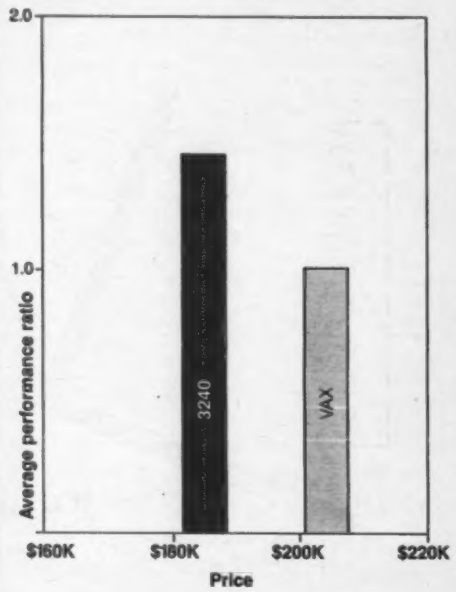
2. Perkin-Elmer 3240 vs. VAX* Average Time by Job Classification



1. Integer
2. Single-precision
3. Double-precision
4. Math functions
5. Single-precision whetstone timings
6. Double-precision whetstone timings
7. Arrays
8. Job mix
9. Compiler technology

*VAX is a trademark of Digital Equipment Corporation.

3. Proven Price/Performance



The configurations tested were 2 MB of memory, 67 MB disc, 75 ips tape, Floating Point Processor, CRT terminal, battery backup, and system software. The 3240 had a Writeable Control Store and Fortran Enhancement Package, while the VAX 11/780 had a Floating Point Accelerator.

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All 58 FORTRAN benchmarks listed in Table 1 were submitted by our customers and prospects reflecting their application needs. Applications that deal with the same kind of problems you face every day.

All benchmarks were run on-site at various locations across the country. And all were run by vendor-trained operators.

In Table 2, we organized the benchmark results into nine common types of job classification, so you can see at a glance how the 3240 stacks up vs. VAX 11/780. (The ninth classification demonstrates the superiority of Perkin-Elmer's system software, in this case globally optimizing FORTRAN VII.)

As shown in Table 3, the story is simple and uncomplicated. The Perkin-Elmer 3240 outperforms VAX 11/780. And it costs less.

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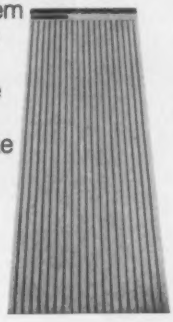

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PERKIN-ELMER

Services Policy Hurts Federal DP: GAO

(Continued from Page 87)
puter system and threatens a number of high-priority government programs, including the space shuttle program and development of the F-15 and F-16 fighters and the B-1 bomber.

Purpose of Law

The 1965 Service Contract Act protects service workers' wages on contract whose principal purpose is to provide services to the federal government.

The law, meant to protect these employees from wage reductions by companies competing for federal contracts, provides that service workers must receive wages and fringe benefits equal to those being paid workers performing similar tasks in their locality.

Cbema has lobbied vigorously against the ruling, arguing it will adversely affect industry merit pay plans, thereby harming the firms' ability to compete in the nongovernment marketplace or force them to set up expensive duplicate service organizations for government-only contracts [CW, July 30, 1979].

Several large computer vendors, including Digital Equipment Corp., Hewlett-Packard Co. and Honeywell, Inc., have reportedly turned down government service contracts because of unwillingness to follow the wage system dictated by the Labor Department.

In its report, prepared for Rep. Jack Brooks (D.-Texas), chairman of the House Government Operations Committee, the GAO said industry response to the law's provisions "could seriously affect maintenance and support of the government's computers — more than 14,300 computers valued by the [General Services Administration] at more than $5.4 billion.

"The loss of continued operation of these computers, through discontinuance of preventative and remedial maintenance services provided mainly by the equipment manufacturers, would shut down major agency operations and programs, and seriously jeopardize the nation's defense and security," the report concluded.

GAO Recommendation

The audit agency recommended Congress amend the act to exclude coverage of DP and other high-technology commercial product support services. Pending that action, the Secretary of Labor should temporarily exempt from the act's coverage contracts for such services, the GAO said.

The GAO came down squarely on the side of Cbema and other high-technology vendor representatives in finding the act "was not intended to cover maintenance services related to commercial products acquired by the government."

Service contracts of this kind, "where government sales represent a relatively small portion of a company's total sales, do not have the same characteristics or incentives for contractors to deliberately pay low wages to successfully bid on government contracts."

Therefore, the GAO said, Labor's application of the act to DP and other high-technology product services is "inappropriate."

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Acquisitions

The **Monchik-Weber Corp.** has acquired **Wall St. Concepts**, a computerized record-keeping service for the financial community.

Hayden Publishing Co., Inc. announced the acquisition of **Programma International, Inc.**, publisher of entertainment, utility and business software for microcomputers.

Semi Processes, Inc., a wafer fabrication and semiconductor manufacturing company, has acquired **MSMasks, Inc.**, a supplier of computer-aided mask design services for integrated circuit manufacturers and custom design firms.

ICE, Inc. has announced the acquisition of **Northrop Data Systems, Inc.**'s assets and obligations in Carson, Calif., for an undisclosed amount.

Northern Telecom, Inc. has acquired a 45% interest in **Avant-Guarde Computing, Inc.**, manufacturers of the NET/Alert system.

The Reader's Digest Association, Inc. has acquired a majority interest in **Source Telecomputing Corp.**, a pioneer in electronic information services.

Anacomp, Inc. has completed the acquisition of a majority interest in **Eikon Technology, Inc.**, a micrographics company based in Manchester, N.H.

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TI820 KSR Printer	2,195	210	117	79
TI825 KSR Printer	1,595	153	85	57
ADM3A CRT Terminal	875	84	47	32
ADM31 CRT Terminal	1,450	139	78	53
ADM42 CRT Terminal	2,195	210	117	79
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QUME Letter Quality RO	2,895	278	155	105
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HAZELTINE 1500 CRT	1,195	115	64	43
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End of Space Shuttle Program?

Contract Act Seen Threatening Site Shutdowns

By Jake Kirchner
CW Washington Bureau

WASHINGTON, D.C. — Numerous federal computer installations, serving millions of Americans and supporting critical government research and development programs, are facing shutdown or impaired efficiency because of a Labor Department policy on service contracts, the General Accounting Office (GAO) said recently.

A GAO survey of 114 federal installations found 42 have experienced difficulties in contracting for data processing and other high-technology product maintenance and repair services because contractors balked at honoring the wage systems mandated under the Service Contract Act.

The GAO urged that vendors of these high-technology commercial products be exempted from the 1965 law that sets minimum wage scales for service workers. The law was never intended to apply to these areas, the GAO said, and Labor's insistence on applying it seriously jeopardizes national security.

The GAO survey, covering agencies with 98% of the government's computers and manufacturers who provided 81% of the federal systems, found a number of installations already affected by industry reluctance to enter service contracts under the terms of the act.

Permanent Shutdown

A U.S. Army facility in Vicksburg, Miss., for example, had to shut down permanently its $12 million computer system because the sole-source contractor would not accept a follow-on maintenance contract with Service Contract Act provisions.

The system is expected to be scrapped, GAO reported, and "replacement computer services are being obtained from sources at much higher costs and considerable inconvenience."

The report pointed out other "programmatic impacts" expected if DP and other maintenance services under contracts expiring now are discontinued and not renewed.

- "Complete stoppage" of the space shuttle program and loss of the base-level support system at the Johnson Space Center, Houston, Texas.
- Delay or discontinuance of the test and research programs of the space shuttle, F-15 and F-16 fighters and B-1 bomber at Edwards Air Force Base, Calif.
- Inability to monitor and record vital signs of critically ill and post-surgical patients at a Veterans Administration hospital in Los Angeles.
- "Serious programmatic impact" on design, development, test, production and retirement of nuclear weapons, including weapon technology, provisioning, stockpiling and transportation at an Energy Department installation in Albuquerque, N.M.
- Loss of administrative base-level support systems at Fort Sam Houston, San Antonio, Texas, including support to Health Service Command activities through the world.

Based on its survey, the GAO concluded its findings were "highly representative of what would be found nationwide."

Fiber-Optic Unit Formed In GTE Lenkurt Branch

SAN CARLOS, Calif. — General Telephone & Electronics Corp. (GTE) has formed a new business unit in its GTE Lenkurt subsidiary, exclusively for the development of fiber optics communications systems. Arthur R. Kraemer has been named vice-president/general manager of this division.

The new operation will initially be based in company headquarters here, but will relocate soon to its own facility, now under construction, in Mountain View, Calif.

The building will provide a centralized unit for developing the fiber optic systems, and it will eventually house an anticipated 300 employees. It is expected to be ready for occupancy in mid-1981.

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IIA, Commerce Nearing End to Wits Dispute

(Continued from Page 87)

[CW, April 14].

After the association pressed its case during Commerce appropriations hearings on Capital Hill this year, a House subcommittee initiated discussions between Commerce and IIA that eventually led to a mutually satisfactory Wits design process.

Commerce has begun the contracting process for an eventual Wits design that will use the worldwide State Department Telecommunications system supported domestically by commercial vendors of communications, timesharing, programming and data base services.

The department issued a "request for information" Sept. 29 seeking possible suppliers of Wits data bases. According to Maurice Kogon, Wits program manager, the responses will help Commerce determine what information can be gathered from the private sector and what it will have to produce itself.

'Sunset Provision'

The final decisions on data gathering will be made by a panel to be named within the next few months. The panel, to consist of about a half dozen neutral parties with expertise in exporting and the information industry, will also periodically review Wits to make sure it lives up to its mandate to supplement, not supplant, private-sector services.

This last, "sunset" provision" is one of the most important parts of the arrangement, according to Robert Willard, IIA vice-president, government relations. If the government offers a service without some provision for terminating it "they effectively chill the private sector from ever doing it because they have set up themselves in that business," he said.

Willard said this industry-government cooperative approach to designing federal information systems is a good way to fill government data needs without harming the private sector and can be used in similar situations by other federal agencies.

Recommended Procedure

Whenever an agency decides it needs to generate an information product it should follow this process of determining private-sector capabilities and then design the system to take advantage of the private sector and augment that only with what is not offered in the marketplace, Willard argued.

If the agency then "passes that before an independent advisory body of some sort and, finally, has a built-in sunset review for the future, that strikes us as a close to ideal way because we're never going to argue that the government has no information requirements" that industry cannot fulfill, he said.

While pleased with the resolution of the Wits controversy, Willard said the IIA "will still have to maintain a very strong involvement, to make sure that we don't drop our guard because it's still an important policy issue.

"But," he continued, "the approach they've taken not only makes sense from a Wits point of view, it makes sense from a government information policy point of view. We're anxious to see it work in the case of Wits so we can start talking about applying it wider."

Orders & Installations

Electronic Realty Associates, Inc. recently ordered 1,500 additional Xerox Corp. Telecopier 400 transceiver units. The national outfit uses facsimile equipment to show its clients pictures of houses in other cities via 3,000 affiliated real estate offices.

Broomall Industries, Inc. has ordered 10 V77 minicomputers valued at $2 million from Univac; and CPT, Inc., a Minneapolis-based manufacturer of word processing equipment, has ordered a Univac 1100/60 to expedite its operations.

The First Federal Savings & Loan Association of Columbus, Ohio, has placed a $1 million order for the Univac 1100/60 System.

New Companies

Advanced Computer Concepts, Inc. has been formed by former Schlumberger employees Charles M. Gilmore and Beverly J. Kitaoka. The new company will draw heavily upon top-down and structured programming techniques in its software ventures. The firm is located at 1921 Ivanhoe St., P.O. Box 15710, Sarasota, Fla. 33579.

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Minority Firm Gets $10.5 Million FAA Contract

WASHINGTON, D.C. — The Federal Aviation Administration (FAA) has awarded a $10.5 million contract to a Waltham, Mass., firm — the largest minority business contract the FAA has ever granted.

Under the contract, made through the regional Small Business Administration in Boston, Input Output Computer Services, Inc. will provide minicomputer-based maintenance subsystems to remotely monitor the accurate operation of distant radars, navigation aids and radio links serving the FAA's 24 Air Route Traffic Control Centers (ARTCC) in the U.S.

Air traffic controllers at these 24 centers, which include Alaska, Hawaii and San Juan, Puerto Rico, are responsible for the separation of aircraft between airport terminals.

Since each center is responsible for hundreds of thousands of square miles of airspace, the numerous navigation and communication aids for pilots and controllers are currently kept in top operating condition by routine visits of FAA maintenance personnel, an FAA spokesman explained.

With many of the aids located on mountain tops and other remote areas, the use of mini-based monitoring devices will preclude the necessity of actual visits to each site.

The minority firm was selected for the contract from three minority-owned computer specialty companies. In signing ceremonies here recently, FAA Deputy Administrator said, "We believe that this contract will relieve our maintenance personnel of countless hours of time in transit and will result in increased safety of air travel throughout the United States."

The terms of the contract call for some centers to be operating with the monitoring systems by next spring, with completion of all 24 sites by 1984, the spokesman said.

Contracts

Pertec, REI Sign Contract For Data Entry Systems

IRVINE,Calif. — Pertec Computer Corp. has signed a three-year contract with Recognition Equipment, Inc. (REI) for the production of a special distributed data entry system.

Under the terms of the agreement, Pertec will provide REI with an enhanced configuration of a distributed data processing system, including a new technology package. Pertec's system will be incorporated into REI's optical character recognition (OCR) systems such as the Input 80 page reader, high speed Trace system, Trim system and the OCR wand reader.

The Pertec distributed processing system will be used to enter data not suitable for OCR entry, as well as to enter characters which are not OCR readable. The system will also be used to perform field edits, validation and balancing of both OCR and key entered data, according to Roberto Maldonado, Pertec division vice-president for international and private label systems marketing.

With the new contract, REI joins Scan Data, Univac, TRW, Inc., and ICL as private label customers of Pertec.

Other Awards

General Robotics Systems, Inc. (GRC) has signed a contract with Plessey Peripheral Systems, Inc. to provide a large quantity of GRC's SDV11 semiconductor disk emulator for Digital Equipment Corp. LSI-11-based microcomputer systems.

Norden Systems has been awarded a $7.9 million U.S. Navy contract for a computerized defense system. The Integrated Automatic Detection and Tracking System will be used by the Navy's missile-firing fleet.

The Hamilton Standard Division of United Technologies has received a $1 million contract to provide computerized aircraft diagnostic systems to Garuda Indonesian Airways and Egyptair.

E-Systems, Inc.'s ECI division has received a U.S. Air Force contract valued at $2.7 million for full-scale engineering development of the digital non-secure voice telephone. A parallel development contract has been awarded to Magnavox Corp.

United Computing Systems, Inc. has signed a contract with Cray Research, Inc. for a Cray-1 S series computer with a capacity for one million words of memory. Terms of that agreement are for a lease, with an option to purchase.

Scientific Systems Services, Inc. (SSS) has recently been awarded more than $1,800,000 of new contracts for software required in computer-based monitoring and control systems for power plants. The largest single contract was a parallel procurement from Duquesne Light Co. and Allegheny Power System, whereby SSS will replace the respective computer systems in two identical fossil fuel plants in the Pittsburgh area.

GTE Telecommunications Corp. received a $190 million U.S. Army multiyear contract to produce electronic telecommunications switches for the nation's army, air force and marine corps' tactical communications programs.

It starts with the right system, one specifically designed to get a new service bureau up and running fast. The BTI 5000 interactive, multi-user computer system can do just that, to beat those high start-up costs.

At BTI, we've been making timesharing systems for over ten years, so we know how to get you going.

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PROGRAMMER/ANALYSTS

ONE BREAKTHROUGH LEADS TO ANOTHER AT NCR

The advanced technological capabilities that enabled NCR to lead the way in the development of distributed data processing and multiprocessing virtual systems are now being applied to the development of a new generation of high-performance mainframes in San Diego. We are augmenting our professional staff, presenting opportunities for you to use your experience to maximum effectiveness in one or more of the following projects:

- **Creating software for virtual systems**
- **Extending the state-of-the-art in distributed and interactive systems**
- **Design system firmware for multiprocessor, distributed processing architecture**
- **Develop new performance evaluation methods in support of transaction, interactive, and distributed processing systems**
- **Increasing interactive speeds and multiprocessing capabilities**
- **Developing new performance evaluation and modeling procedures**

Immediate opportunities are available for:

SENIOR SYSTEMS ANALYSTS

You will design, code and debug a major portion of the firmware for the new large-scale, high performance distributed processing system; or you could design the system memory S/W; or you may prefer to evaluate and analyze measurement results. You can take your pick if you have a BS/CS or equivalent with related experience.

TELECOMMUNICATION PROGRAMMER/ANALYST

Under direction of Senior Systems Analyst you will design, code, debug, test and document telecommunications systems S/W. A BS/CS or equivalent and knowledge of Assembly languages with Pascal training a plus.

PERFORMANCE ANALYST

You will use your expertise in computer performance evaluation to support the development of transaction, interactive and distributed processing systems. Through analysis measurement and modeling you will assist in the production of high performance, highly competitive systems.

FIRMWARE PROGRAMMER/ ANALYST

Design and implement microprograms for high level language virtual machines, I/O processor, and memory hierarchy management. Assembly language experience required.

O/S PROGRAMMER/ANALYST

Responsible for development and support of NCR's large scale virtual programs. Duties will include isolation and correction of field reported problems, design of software modules and tests, development of specifications and implementation of approved changes. Experience in Assembly language and virtual memory O/S desirable. Requires BS/CS or equivalent.

CONSULTANT/ANALYST

As project leader, you will lead the design and implementation of application processor firmware which will interface with O/S Software. BS/CS or equivalent experience with eight years' programming and knowledge of O/S and computer architecture required.

Equal to the career-growth opportunities, excellent salaries, and extensive benefits that NCR offers, are the pleasures of living and working in the San Diego area. Relocation assistance will be provided.

Send your resume to: Mr. Hal Ostrander, Personnel Resources, Dept. K50, Engineering and Manufacturing, NCR Corporation, 16550 W. Bernardo Drive, San Diego, CA 92127.

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DP PROFESSIONALS

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NEW ORLEANS

S&P MANAGER

Sub of Fortune 500 firm is seeking responsible person to fill this newly created pos. Candidate must have 3 yrs as prog mgr plus on-line sys dev. COBOL bus appl bkgd.
To $35,000

PROGRAMMER/ANALYST

Many pos are available for persons with 1+ yrs COBOL/RPG/PL1/FORTRAN exp.
To $16-30,000

ROBERT HALF
of New Orleans
135 St. Charles, Suite 1020
New Orleans, LA 70130
(504) 524-3773

DAYTON

SYS PROGRAMMER

Ohio Co seeking 3-5 indiv's with solid IBM mainframe operating systems internals bkgrd. This wealthy org is rapidly expanding its data processing dept to accommodate recent Co growth. Co now has most comprehensive relocation package ever. Super benefits! $25-35,000

ANALYST/PROGRAMMER

Prestigious Dayton firm needs indiv w/2-3 yrs exp in IBM Assembler & COBOL. Data base is a definite + but Co will train. Benefits are tops.
$18-27,000

ROBERT HALF
of Dayton, Inc.
One First National Plaza
Dayton, OH 45402
(513) 224-0600

ATLANTA

TECHNICAL ANALYST

Leading Corp Data Center seeks person with strong technical skills and supervisory exp. Pref'd are: Strong COBOL, ALC, OS and CICS Macro's. Shop currently running 3033, 370/165. Good location, liberal Benefits and relocation package $30,000

PROGRAMMER/ANALYST

Top-rated company adding to staff. Person will be involved in new appl design and programming. COBOL, OS/VS1 and General Business application exp B A L is a plus. Excellent opportunity to work with top professionals. $23,000

SYSTEMS ANALYST

Fast-pace, exciting atmosphere waiting for you. Unique opportunity with long-term growth potential. Need creative thinker, seasoned professional to handle varied projects. Should have large IBM, COBOL, System Design and ability to communicate with users. $28,000

Ray Jennings
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of Atlanta, Inc.
3379 Peachtree Rd. N.E.
Atlanta, GA 30326
(404) 266-2153

PORTLAND

PROG/ANALYST

Excellent Portland firm requires 3-4 yrs assembler on large scale CPU. Application background is open. Growth opportunity. Salary $19-24,000

PROG/ANALYST

Progressive company seeks 3-5 yrs exp in 370-OS. Requires COBOL and/or assembler. Should have "hands on" exp with IMS or other DBMS. Familiar with on-line development tools. Salary $20-$29,000

EDP AUDITOR

Fortune 500 company requires 3-5 yrs Big 8 MAS staff exp with manufacturing background. Utilizing large scale IBM CPU. 50-60% travel in US 4 day work week. CPA and/or MBA preferred. Salary $27,000 +

PROG/ANALYST

Corp Headquarters requires 3 yrs + FORTRAN, COBOL, MARK IV exp. Must have good analytical skill & strong business background. Prefer MBA. Salary $20-30,000

Bob Clawson
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of Portland, Inc.
One S.W. Columbia
Portland, OR 97258
(503) 222-8778

SEATTLE

Prestige Seattle consulting firm seeks programmer/analyst with 4+ years HP3000, DEC or PRIME experience in financial/business applications. Some travel in Northwest area to install minicomputer financial software.
To $24,000

SEATTLE DP shops are eager to interview experienced IBM COBOL & RPG II programmer/analysts. If you have 1+ years experience and plan to visit here, call me collect or send resume ASAP.

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PHOENIX

SYSTEMS PROGRAMMER

Play a key role developing software products for IBM OS/VS environment. Two years ALC experience required. Design background and a familiarity with DASD protocol helpful.
Starting salary to $27,000

PROGRAMMER ANALYST

Prestigious fin'l inst seeks several assembler programmers with on line experience. IBM 370, 3033, OS/MVS shop. Starting salary to $22,000

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RPG II MANAGERS OR PROG

System 3/15D or System 32, 34 installations. To $35,000

SOFTWARE MANAGER

IBM 370/OS experience Supv small staff. To $30,000

SYSTEMS PROGRAMMERS

IBM OS & DOS, needed immediately. To $32,000

COBOL PROGRAMMERS/ ANALYST

IBM or Burroughs experience in a manufacturing of financial environment. To $30,000

EDP AUDITORS

IBM OS & DOS environments require EDP Auditors at all levels. To $30,000

DATA BASE ANALYST

Experience with DMS, DL1, ADABAS, IDMS or CICS.
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San Jose, CA 95112
(408) 293-9040

DENVER

MANAGER

Rapidly growing Colorado manufacturer is redefining their data processing requirements. They have a ground floor opening for a manager with proven experience. Must be able to handle the implementation of large online manufacturing applications on an IBM 370 DOS-VS online system. Prior supervisory exposure necessary.
Start $38,000 range

PROGRAMMER ANALYST

Large energy firm is expanding their Denver operation and is currently seeking a programmer analyst with large scale IBM 370 DOS or OS hardware experience. Must have a working knowledge of COBOL and be able to work on large online accounting systems. Excellent growth potential.
Start $27,000 range

Steven Newman
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of Denver, Inc.
2 Park Central
Denver, CO 80202
(303) 629-1010

MIAMI

SR MVS SYSTEMS PROGRAMMER

Major S Florida Corp offers 'State of the Art' position. Opportunity to join leading division of Fortune 500 at a Sr. level. Full relocation, excellent benefits with a career path leading to management. Minimum two years experience with MVS system generation and maintenance. Working knowledge of COBOL, Assembler, JCL and utilities required. Experience desirable in data base systems (IMS), data communications and computer performance evaluation.
Salary to $35,000

Chuck Nell
ROBERT HALF
of Miami, Inc.
1395 N.W. 167th Street
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Miami, FL 33169
Call Collect
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KANSAS CITY

DATA PROCESSING MANAGER

Johnson County recently acquired subsidiary of Fortune 100 company seeks a Data Processing Manager. Must be capable of coming in and taking over a System III Model 15 shop with CCP installed. The ability to dig in and bring systems and standards up to date is essential. Job reports straight to the General Manager. Salary to $32,000

DATA BASE ANALYST

Expanding 3032 shop under MVS with IMS DB/DC needs an innovative data base analyst. Prior experience with IMS required. Salary to $31,000

MANAGER

Sr P/A, lead analyst, or Programmer leader move up to your first management position. 100 million Midwest Manufacturing seeks a manager of systems and programming. Take over staff of 7 in 2 MEG 370/148 OS/VS, environment with two 4300's due in November. Excellent MBO package and opportunity to move to Data Processing Manager in two years.
Salary to $30,000

SENIOR PROGRAMMER/ ANALYST

Get involved in a top-notch K C manufacturing concern looking for a person with two plus years experience in business applications. Opportunity to learn CICS and DLI as well as move in to Systems area. High visibility. Present configuration is 370/148 DOS/VS and moving up. COBOL is essential.
Salary to $27,000

MANUFACTURING PROGRAMMER

Expanding suburban Fortune 500 firm has a position for a solid manufacturing applications programmer. IMS/DB in an OS environment a plus, mfg application experience a must. Will work in project teams with heavy user contact. Challenging position affords an excellent career with an industry leader. Salary to $26,000

PROGRAMMER

Expanding DOS/VSE shop seeks an experienced COBOL programmer. CICS and DLI training provided. Solid corporation with good growth potential. Good benefits.
Salary to $23,000

George Waterman
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of Kansas City, Inc.
127 W. 10th
Kansas City, MO 64105
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PL/1 OS MVS SENIOR LEVEL

Challenging position for DP pro with high aspirations. 2+ years PL/1 programming experience. Financial applications experience is a definite plus. Environment is 370/158 OS MVS CICS. Outstanding training program will continually upgrade state-of-art knowledge. $26,000

DP MANAGER SYSTEM 34

Take over management of newly installed SYSTEM 34. 2+ years RPG II programming experience and management responsibility. Applications are A/R, A/P, INVENTORY and CASH DISBURSEMENTS. Ground floor opportunity.
$31,000

FORTRAN CMS

Extraordinary opportunity to aid in conversion from outside time-sharing to IN-HOUSE. 1+ years FORTRAN and VM 370 experience. PL1 programming experience is a definite plus. Ground floor opportunity in pleasant working surroundings. $25,000

PDP 11/45 DP MANAGER

A REAL opportunity in this rapidly growing data center. 3+ years DEC, CDMS and BASIC or MUMPS programming with supervisory responsibilities. Will be responsible for staff management and design through implementation of business applications. A professional environment.
$28,000

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An excellent career enhancement. 3+ years in design through implementation of financial systems with experience in evaluating commercial software packages. Environment is Dual 370/168 OS, VS, CICS, DL1. Realistic growth potential. $33,000

Marty Amato
ROBERT HALF
of New York, Inc.
522 Fifth Avenue
New York, NY 10036
(212) 221-6500

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Milwaukee, WI 53202
(414) 271-HALF (271-4253)

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SYSTEMS PROGRAMMER

Education is DOE — IBM 370 environment DOS, CICS, COBOL, RPG II, utilities, On line prog. Candidate must have 7 plus years in DP field with the last three being in systems work. Hardware evaluation exp a real plus. $30,000

PROGRAMMER

Degree preferred — 2 plus years of COBOL exp preferably in IBM/OS environment VS/VM, CMS, CICS, with financial exp a plus. Good growth and advancement with this Gulf Coast Company.
$20-24,000

PROGRAMMER

Degree preferred, Burroughs, COBOL and banking exp a MUST. On line and evaluation expertise a real plus. Fast track company expanding staff.
$25,000

Bob Baldwi
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of San Antonio, Inc.
First Natl Bank Bldg #340
San Antonio, TX 78201
(512) 736-2467

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To $28,000

IBM SYS 3, 34

Several positions in this area ranging from P/A to Asst Manager to Director. Extensive knowledge of RPGII, CCP. Salary $18-30,000 dependent upon qualifications.

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COBOL PROGRAMMERS

IBM DOS/VS, OS/MVS, IMS, CICS. Burroughs, Mini's

EDP AUDITORS

2-4 years in place. IBM, Extract, TSO ground floor opportunity.

SYSTEMS ANALYSTS

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Bob Couch
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BOSTON

MIS MGR - MAINE

Leading electronics mfr seeks highly motivated indiv who thrives on responsibility, to manage small prof software staff of 10. Prior supvry & mfg apps exp desired. Rpts to div MIS Director. Hvy corp exec interface. Salary $33,000 range

WORK STANDARDS ANALYST

Internal consulting staff of major fin'l svcs org seeks analytical indiv with work measurement & design exp for manual sys review & design. Large IBM mainframe & distributed processing environ. Proj leadership & automated sys exposure offered. Salary $23,000

DATA BASE ADMIN

Nat'l recognized elect mfr seeks take charge self-starter to manage DB/DC function. Hvy sys planning with fin'l, mfg & sales apps knowl desired. Oppty to move forward in executive climate. Salary $29,000

PRODUCT ANALYST

Major mini vendor seeks mktg pro to develop new business products from concept through prototype. Will supv field tests, analyze results & rec further development. Exp in mini hardware & software pref. Salary $30,000 area

TECH WRITER

Major computer vendor seeks innovative, dynamic software writer to support user & systems documentation. Will work on small, prof staff. Hvy user interface coordinating will all mgmt levels. Salary $23,000

RETAIL SYSTEMS ANALYST

Leading retail chain seeks sr systems analyst to lead in the design of new apps. Large IBM VM COBOL CICS environ. Retail or POS exp pref. Hi-visibility position leading to mgmt. Salary $28,000

MRP PROJECT MGR.

Fortune 500 mfr seeks software devel ldr with in-depth mfg & materials control exp to direct revitalization of corp systems. Major project admin exp in mainframe environ desired. Need tech mgr with VP potential. Salary $32,000

Gerry Bettista
ROBERT HALF
of Boston, Inc.
100 Summer Street
Boston, MA 02110
(617) 423-1200

MINNEAPOLIS/ ST. PAUL

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Large regional CPA firm has a newly created ground floor opty. If you have 3-5 yrs CPA MAS bkgd you may qualify. Additional exp with the mini mkt and client contact will be very helpful. Excellent promotion possibilities. Salary to Low $30's

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Excellent position within Fortune 500 firm. Included in your 5 yrs DP bkgd you should have large scale Honeywell and data base exp, pref DM IV. Will be responsible for fin'l applications. Degree very helpful. Salary to Low $30's

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or
Kathi Grant
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of Minneapolis/St. Paul, Inc.
2236 IDS Center
Minneapolis, MN 55402
(612) 338-9001

PROVIDENCE

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Dynamic hi-tech mfr seeks sr analyst for COPICS system devel. DL/1 CICS skills desired. Project mgmt potential. $30,000

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Prominent RI consumer products mfr seeks D P pro. Supv med size staff, schedule projects, estab program stds & maintain software control. Systems analysis, COBOL, CICS & TOTAL bkgrd. $28,000

PROJECT LEADER

Aggressive fin'l svcs co desires sr prog analyst to lead proj team in design & installation of major fin'l apps. Knowl of OS JCL COBOL BAL. Project planning & control + on-line systems exp req. $25,000

SYSTEMS PROGRAMMER

Ind leading mfr seeks indiv with strong tech & communicative skills. 3031 DOS/VS, CICS & DMS CMS pref. Career growth to tech support mgmt. $25,000

PROGRAMMER/ANALYST

Prestigious ins co desires skills app programmer with macro CICS & IBM Assembler exp. Solid D P oppty in excellent project environ. $22,000

Robert Lathrop
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of Providence, Inc.
400 Turks Head Bldg.
Providence, RI 02903
(401) 274-8700

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If you are traveling a great deal with your current position and would like to get off the road, two CPA firms in the Louisville area are interested in someone with 3+ years consulting experience with mini computers. Manufacturing or healthcare background preferred. Relocation and interview expenses paid. Degree a must, higher a plus. Starting salary to $35,000

SYSTEMS PROGRAMMERS

Louisville based manufacturing firm is seeking a heavy systems programming type. IMS, DL/1 background is a must. Co is installing a 4331. A degree is a plus *not* a must. Excellent benefits and relocation plan. Call me collect today. Starting salary to $33,000

PROGRAMMERS

Louisville based firms are looking for COBOL and Assembler programmers. If your background is banking, mfg, retail or hospital 1 or more years working experience is all that is required. With degree salary to $24,000 With no degree salary to $21,000

Tom Williams
ROBERT HALF
of Louisville, Inc.
680 South Fourth St.
Louisville, KY 40202
(502) 585-1751

W. MICHIGAN

SYSTEMS PROGRAMMER

Exciting "ground floor" opportunity in smaller shop ready for major EDP expansion. Install new 4331, head up future tech support. Must be familiar with DOS/VS operating systems, CICS. Salary negotiable to high $20's.

Joseph Grabinski
ROBERT HALF
of Western Mich., Inc.
180 Division N. Suite 302
Grand Rapids, MI 49503
(616) 458-2333

HARTFORD

CONSULTANTS-EUROPE

Opptys in Europe, Africa for indiv's with design exp in harbor/seaport automation, traffic, routing, ship-building, etc. 2 yr assign with salary $37+ with expenses & housing.

SYSTEMS MANAGER

Conn insurer seeks indiv to direct all sys devel proj. IBM exposure along with current mgmt exp req for this very visible, promotable situation. Salary to $37,000

EDP AUDITOR

Conn opening for indiv with industrial D P Sys exp & exposure to this audit process. Cand will work in small unstructured environ in div of lge nat client. Salary to $30,000

SALES SUPPORT

Lg data comm vendor seeks indiv's for multiple U.S. locations to provide IBM-compatible TP product support. Network design, SNA, VTAM, etc exp. Salary to $32,000 +

SR D B SPECIALIST

Major fin'l corp seeks exp analyst to install & maint D B software. Knowl of MVS, CMS, & CICS. Hi-visibility pos w/heavy corp & vendor interface. Salary $30,000 +

SR ANALYST PROG

Diversified fin'l firm desires proven COBOL exp to participate in analysis & design of on-line, interactive system. DMS/CICS highly desirable. Multi-user environ. Premier corp. Salary $25,000

TECH ADVISOR

Outstanding Conn based corp seeks exp D B or Telecomm pro with strong IBM OS hardware/software knowl to research & plan develop tech to support major app sys. Salary to $35,000

Stan Durbes
Paul Meissner
ROBERT HALF
of Hartford, Inc.
111 Pearl Street
Hartford, CT 06103
(203) 278-7170

LONG ISLAND

SYSTEM 38 ASSISTANT MANAGER

Attend IBM 38 School this fall. Move up to DP Mgr in 2 yrs. Receive unbelievable benefits including Medical, Dental, Bonus, Profit Sharing, and Cost of Living increases ... and the salary will go to Mid $20's

All this for 2+ yrs System 3 RPG II and some CCP knowledge

Michele Briggs
Laura Sessions
ROBERT HALF
of Long Island
420 Jericho Tpke.
Jericho, NY 11753
(516) 822-8080

CHICAGO

PROGRAMMER/ANALYST

Excellent opportunity. Exposure to sophisticated state-of-the-art equipment (hardware and software). Two plus years experience with IBM software: IMS, structured, COBOL, and IBM hardware: IBM 370/158, OS/MVS. Outstanding company benefits. Salary to mid $20's

Martin Breiner
ROBERT HALF
of Chicago, Inc.
35 E. Wacker
Chicago, IL 60601
(312) 782-6530

BUFFALO

SR SOFTWARE PROG

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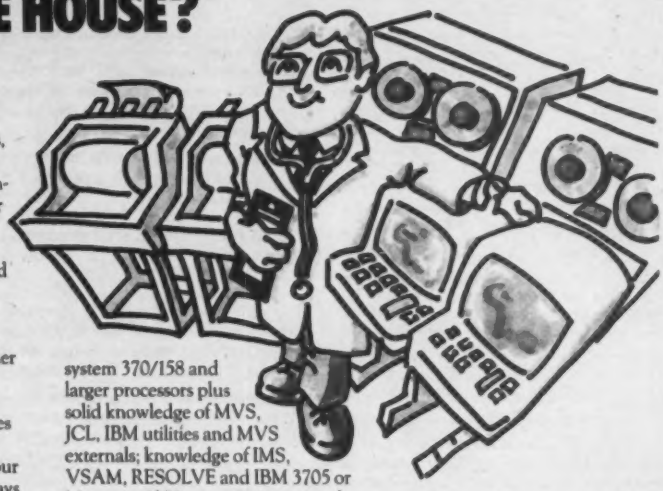

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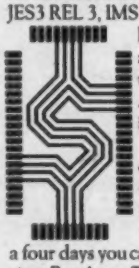

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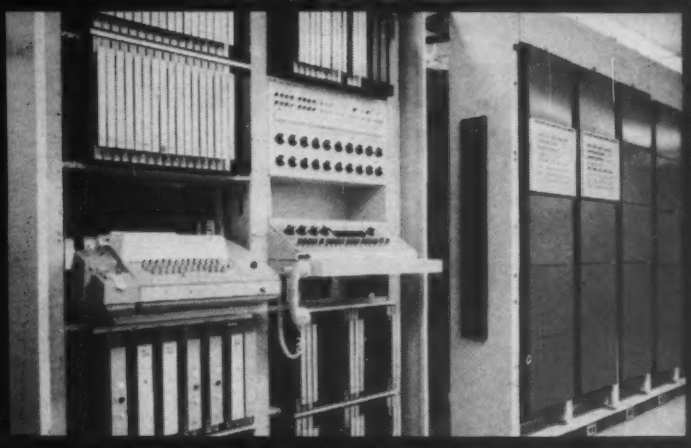

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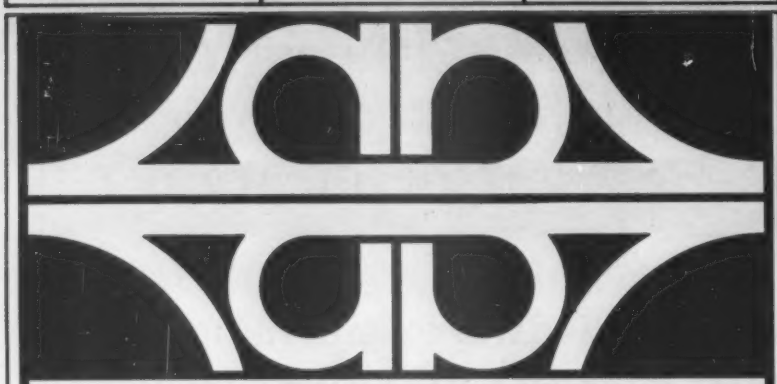

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3. Or you can go to an NCA firm that specializes in Computer Career Advancement, both locally and nationally. Once there you'll see a maximum number of opportunities from which to select your preference. You'll also receive the very finest professional representation and services available to you in advancing your career.

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Columbus: Michael Thomas, Inc., 65 E. Wilson Bridge Rd., Suite 201, Worthington, Ohio 43085 (614) 846-0926
Dallas: DataPro Personnel Consultants, 5580 LBJ Freeway, Suite 650, Dallas, Texas 75240 (214) 661-8600
Denver: EDP Infinity, Inc., 6000 E. Evans Ave. Bldg. 2-111, Denver, Col. 80222 (303) 753-1788
Detroit: Electronic Systems Personnel, 3000 Town Center, Suite 2580, Southfield, Mich. 48075 (313) 353-5580
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Houston: Career Consultants, Inc., 2030 South Post Oak, Houston, Texas 77079 (713) 626-4100
Indianapolis: Computer Personnel Services, Inc., 107 N. Pennsylvania, Indianapolis, Ind. 46204 (317) 634-4712
Kansas City: Electronic Data Personnel, Inc., 1006 Grand, Suite 1202C, Kansas City, Mo. 64106 (816) 421-6031
Los Angeles: Constellation Enterprises, 3250 Wilshire Blvd., Suite 1004, Los Angeles, Cal. 90010 (213) 487-0616
Milwaukee: EDP Consultants, Inc., 11430 W. Bluemound Rd., Milwaukee, Wis. 53226 (414) 476-0077
Minneapolis: Electronic Systems Personnel, 858 Twin City Federal Tower, 121 S. 8th St., Minneapolis, Minn. 55402 (612) 338-6714
New Jersey: System Search, 2040 Milburn Ave., Maplewood, N.J. 07040 (201) 761-4400
New York: Botal Associates, Inc., 405 Lexington Avenue, New York, N.Y. 10017 (212) 687-0906
North Carolina: DataMasters, Div. of TaskForce, Inc., P.O. Box 6888, Greensboro, N.C. 27405 (919) 373-1461
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San Francisco: The Computer Resources Group, Inc. Agency, 303 Sacramento St., San Francisco, Cal. 94111 (415) 398-3535
Seattle: Houser, Martin, Morris & Associates, 1940 116th Ave. N.E., Bellevue, Wash. 98004 (206) 453-2700
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Please send resume and salary history to:

Nancy Bergmans
HOME FEDERAL SAVINGS & LOAN ASSOCIATION
P.O. Box 2070
San Diego, CA 92112

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World Vision, an evangelical humanitarian organization, needs a Systems Administrator to lead a small technical support staff responsible for system software installation and maintenance, and application software installation. Requires 5 yrs exp as system analyst, prefer min of 1 yr exp with DEC-SYSTEM-10 or -20.

Send resume to John Miner, World Vision, 919 W. Huntington Dr., Monrovia, CA 91016.

EOE-M/F

Data Processing

SYSTEMS PROGRAMMERS

Are you looking for a challenging position in systems with an exceptional opportunity for professional growth. Hunter College is seeking two qualified individuals with experience in systems programming to provide technical support services for an IBM 370/145 (1 MEG) OS/VS1 operation, currently implementing an on-line database management system utilizing IDMS DB/DC, and planning to upgrade to an IBM 4341 next year.

Responsibilities: Maintenance of all operating systems software. Technical support for operations and programming staff. Systems performance analysis and tuning.

Requirements: Solid IBM Assembly and OS JCL background. VS1 Sysgen and maintenance experience preferred. IDMS DB/-DC experience desirable. Baccalaureate degree or equivalent years of education and/or experience.

Competitive salary and excellent fringe benefits including 5 weeks vacation. Send your resume and salary history in confidence to **Mr. John P. McGloin, Director, Computing Center, Box 331, Hunter College, 695 Park Ave., New York, N.Y. 10021.**

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Consider the following challenges and opportunities:

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Responsibility includes supervision of computer, operations, data communications, systems analysis, programming and support functions, feasibility studies, planning for short and long-range systems design and development.

Successful candidate will have a strong commercial management and technical background. Other key attributes for this position include a degree in business and recent experience in distributed on-line processing, formalized departmental reporting and control, and knowledgeable about data security.

Information submitted for consideration must be complete and contain salary history. Write: **CW Box 2418, 375 Cochituate Rd., Rte. 30, Framingham, Mass. 01701.**

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The Department of Physics and Astronomy of The University of Iowa has an immediate opening for a Senior Programmer Analyst to prepare and develop complex scientific programs for processing of space physics data received from several instruments on NASA spacecraft. Programming will be for a UNIVAC 418 system, IBM 370/168, and/or on a remote time-shared basis via a high-speed data link with a NASA computer system. Requires a bachelor of science degree in Computer Science, Mathematics, or Physics or an equivalent combination of education and experience; a master's degree is desirable. Requires knowledge applicable to scientific programming; requires a knowledge of Fortran, Machine Language and Assembler Language. Microprocessor experience is desirable. Salary: $15,410 - $18,000 commensurate with education and applicable experience. Applications should be submitted to: **T.D. Robertson, Department of Physics and Astronomy, The University of Iowa, Iowa City, Iowa 52242.** The University of Iowa is an Equal Opportunity/Affirmative Action employer.

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Qualified candidates will utilize their expertise in an expanding state-of-the-art environment. Requirements are as follows:

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- **PROGRAMMER ANALYST**

At least 1-3 years OS/COBOL, OS/JCL, TSO. To $23K.

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At least 3 years analysis and design in on-line or batch environment. Must have ability to interface with upper management. To $30K.

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Programming

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Personnel Office - Code 80-018 or 80-019

.kms fusion inc.

P.O. Box 1567
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Professional Engineer with BSEE and 1 or more years microprocessor, process control system experience in a large complex manufacturing environment. Good communication skills.

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Creative people with a degree in computer science or related field combined with 1 or more years experience interfacing with various aspects of Accounting and Human Resources, within a manufacturing environment.

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RSX 11M/M PLUS TEAM: Requires at least 2-4 years experience in operating systems support, consulting or development, with 2 years experience with RSX-11M. MACRO 11 experience and a working knowledge of operating systems concepts are needed.

VAX/VMS TEAM: Requires at least 2-4 years experience in operating systems support, consulting or development. VAX/VMS experience is not required but would be a plus. ASSEMBLY language experience and a working knowledge of operating systems concepts are a must.

All positions offer competitive salary/benefits package, relocation assistance to Colorado Springs; an area with clean air, a reasonable cost-of-living and a wide variety of recreational and cultural attractions.

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Requires a BS or equivalent in a technical or commercial discipline plus at least 2 years COBOL or FORTRAN programming experience. Starting salary: N9,000.

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Staff earning less than N9,033 p.a. will be paid N35 p.m. Staff earning N9,033 p.a. and above will be paid N50 p.m.

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Senior Staff are entitled to annual leave of 36 consecutive calendar days. Public Holidays falling within the leave period may be added to the annual leave.

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The Company runs medical insurance schemes for in-patient and out-patient treatment.

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All new staff will have to undergo a probationary period of one year.

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An Employee becomes eligible for membership of the Fund on confirmation of his appointment. The employee contributes 5% of that part of his salary which is in excess of the level of salary on which contributions are payable to the National Provident Fund. The Company contributes into the Fund 7.5% of his annual basic salary on his behalf.

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Members of the Shell-Nigeria Provident Fund are automatically members of a non-contributory pension scheme. Pension age is 55 years for men and 50 years for women.

HOME OWNERSHIP SCHEME
On confirmation of his appointment the employee is eligible to join the Company's Home Ownership Scheme which assists staff to obtain mortgages from the Federal Mortgage Bank to purchase or build a house for their own occupation.

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N150 per month	N210 per month	N135 per month	N185 per month
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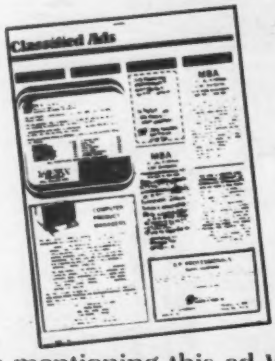

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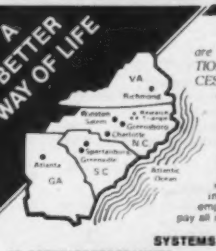

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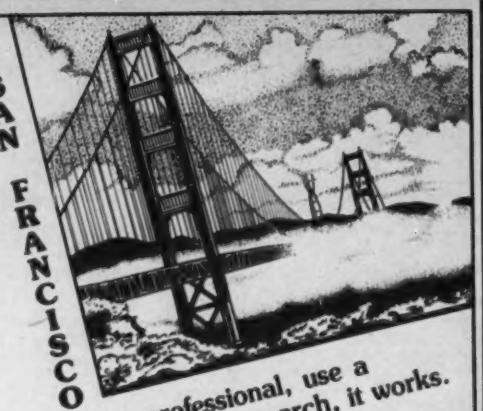

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University of Wisconsin-La Crosse
AA/EOE

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Data Processing

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Your background must include a minimum of 2 years experience with IMS — a minimum of 1 year experience with IMS under MVS. It would be desirable if you also have had experience with TSO and RACF. You will be supporting an online IMS system using IBM Data Dictionary and Application Development Facility.

Richman's is an extremely progressive company with several manufacturing facilities as well as retail stores located in 37 states. We are America's largest manufacturer/retailer of men's clothing. We feel we can offer you a challenging opportunity supporting a state-of-the-art computing environment.

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M.G. Denham
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MARKETING

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DATA PROCESS SYSTEMS, INC., one of the nations leading independent terminal distributors, has a challenging position available for a TERMINAL PRODUCTS MANAGER. Successful candidate must be data communications/applications oriented, familiar with all phases of data communications protocol including IBM 32XX equipment and ASCII Terminal equipment. This position will include extensive customer contact plus some travel. Interested applicants must have a minimum of 4 years experience in data communications, technical degree desired. Our company offers excellent salary and benefits including 100% hospitalization, dental and profit-sharing. Please send resume to:

DATA ACCESS SYSTEMS, INC.
P.O. BOX 1230
Blackwood, N.J. 08012
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SYSTEMS SOFTWARE PROGRAMMER/ANALYST TANDEM FROM 35K

Applied Data Systems, a well established Phoenix based computer company, is seeking a strong Systems Software Programmer/Analyst with extensive Tandem computer software experience.

Excellent fringe benefits including medical, dental, life & accident insurance as well as an outstanding pension plan.

Send Resume to:
ADS/SSPA
P.O. Box 2088
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Qualified candidate will possess at least 6 months COBOL experience including exposure to business applications. The ability to communicate effectively is essential.

We're a growth oriented company offering a salary commensurate with experience and a comprehensive benefit package. Send resume with salary history in confidence to:

Personnel Director
VANCE PUBLISHING CORPORATION
300 W. Adams
Chicago, IL 60606

SYSTEMS ANALYST

Personnel Systems

Federal Express is a dynamic, growing company that provides reliable overnight transportation of high priority packages throughout the U.S. We currently have a challenging opportunity for an individual who has the background to take on a "state-of-the-art" Personnel Information System.

Requisite experience should include a degree in data processing or math, or 3+ years experience as an analyst working on a Personnel Information System utilizing In-Sci, GRS, Data Analyzer and IMS. COBOL programming and excellent interpersonnel skills a must.

For more information on Federal Express and this opportunity, please send your resume or letter of inquiry, to:

Ann Mullis
FEDERAL EXPRESS CORPORATION
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Memphis, TN 38194

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No resume required. If you are interested, contact Richard Linch at (716) 853-6203, or send your RPG II background and salary requirements to Romac & Associates, P.O. Box 67, Orchard Park, NY 14127.

ROMAC Personnel Consultants
Accounting/Finance, Data Processing and Banking
P.O. BOX #67, Orchard Park, NY 14127

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EEO/AA Employer

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You belong in our Technical Support Division if you are experienced in any of the following areas:

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—IBM or PCM Disc, Tape or System Maintenance
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10231 Bubb Road
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Attn: Pat/Diana

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San Antonio, Texas 78229
(512) 680-0390

12860 Hillcrest Road
Suite 123C
Dallas, Texas 75230
(214) 661-2088

4001 N. 32nd Street
Suite E-C
Phoenix, Arizona 85018
(602) 954-7100

360 S. Monroe Street
Suite 330C
Denver, Colorado 80209
(303) 393-0244

19742 MacArthur Blvd.
Suite 245C
Irvine, California 92715
(714) 851-0311

3440 Wilshire Blvd.
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Los Angeles, California 90010
(213) 382-6371

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Sacramento, California 95815
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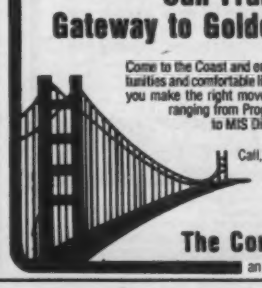

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Mr. William B. Duke
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Ad closing is every Friday, 10 days prior to issue date.

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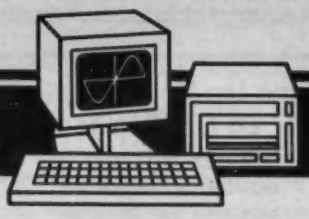

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- I/O PROGRAMMING & REAL TIME PROCESSING SOFTWARE DEVELOPMENT
- OPERATING SYSTEM DEVELOPMENT & ENHANCEMENT
- GRAPHICS SOFTWARE DEVELOPMENT & SUPPORT

If you are interested in growing with Terak in the exciting field of graphics computer technology, please submit your resume in confidence to Susan Tellier, Personnel Administrator:

TERAK CORPORATION
14151 North 76th Street
Scottsdale, Arizona 85260
602/998-4800

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Northeast Utilities and its operating subsidiaries are the prime suppliers of electric power to Connecticut and western Massachusetts with a continuing record of dependability and growth encompassing nuclear, hydro and fossil fuel power generation.

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Engineering Software Development section requires scientific programming oriented individuals to be involved in the development of engineering/scientific software systems from initial definition through implementation. These functions include the planning, engineering and operation of NU's Generation, Transmission and Distribution facilities. Software efforts include large scale engineering analysis, such as electrical network modeling and generating station/nuclear reactor simulation and on-line system applications, such as health physics and nuclear plant records. Applications development is through a TSO/VSPC/CICS/-GDDM environment, utilizing FORTRAN, PL/1 and BASIC. Applicants should have a B.S. in engineering or computer science and electric utility experience would be helpful.

These positions offer an attractive compensation package and a stimulating working and living environment in Connecticut.

Qualified applicants should send their resumes to:

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NORTHEAST UTILITIES
P.O. BOX 270,
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INFORMATICS, INC.

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Professional Services Operations West
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Name:

Company:

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Telephone:

Send this form to:
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Route 30, Framingham, MA 01701

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If you are a DP Pro with several years of design and/or programming experience on large mainframe or mini computers, contact us today. Cameron offers you an excellent benefits package that includes medical/dental coverage. Offices are located in San Francisco, Santa Clara, Los Angeles, Orange County and Houston.

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(415) 957-9600

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Suite 200-D
Santa Clara, CA 95051
(408) 496-0232

HOUSTON
1900 West Loop South
Suite 1180
Houston, TX 77027
(713) 623-6300

LOS ANGELES
4640 Admiralty Way
Suite 409
Marina del Rey, CA 90291
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CAMERON PROGRAMMING CONSULTANTS

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Mr. Robert S. Shank, Chairperson
Department of Mathematics and Computer Science
Millersville State College
Millersville, PA 17551

Applications must include complete personal data, educational background (**with transcripts**), professional experience, etc. plus three references. Millersville State College earnestly seeks and is eager to receive applications from minority and women candidates.

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DON BLOUIN
Northside Air Terminal Tower
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Atlanta, GA 30340
(404) 457-4100

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Qualified candidate will have previous programming experience in a manufacturing environment, knowledge of RPG II, and exposure to IBM System 34. Your ability to interface with all levels of management and computer operations personnel will ensure your high career visibility and growth potential. An excellent salary and benefits package is available. For immediate consideration, please send your resume including salary history in confidence to:

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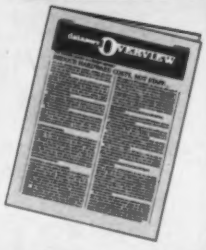

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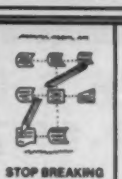

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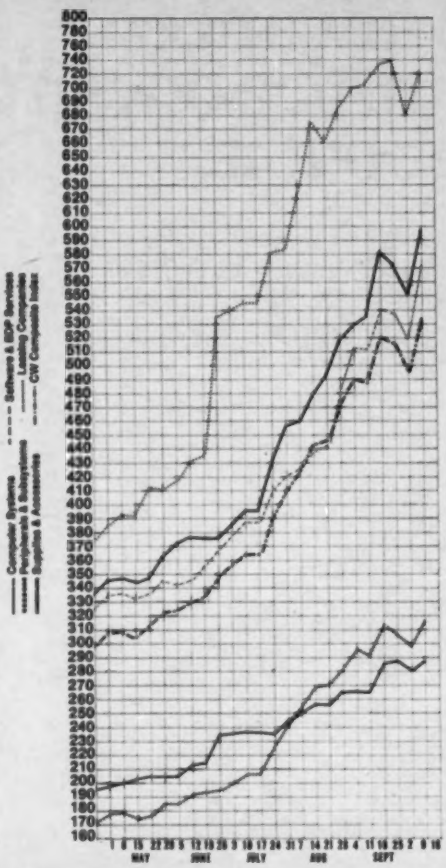

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A. Total number of copies printed (net press run)	113,589	115,948
B. Paid circulation		
1. Sales through dealers and carriers, street vendors and counter sales	None	None
2. Mail subscriptions	106,715	109,324
C. Total paid circulation	106,715	109,324
D. Free distribution by mail, carrier or other means, samples, complimentary and other free copies	3,578	3,931
E. Total distribution (Sum of C and D)	110,293	113,255
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2. Returns from news agents	None	None
G. Total (Sum of E, F1 and 2 - should equal net press run shown in A)	113,589	115,948

I certify that the statements made by me above are correct and complete.

Margaret Phelan
Vice-President/Circulation

Computerworld Stock Trading Summary

TRADE QUOTES

CLOSING PRICES WEDNESDAY, OCTOBER 8, 1980

All statistics compiled, computed and formatted by TRADE QUOTES, INC. Cambridge, Mass. 02139

COMPUTER SYSTEMS

E X C H		1979-80 RANGE (1)	CLOSE OCT 8 1980	WEEK NET CHNGE	WEEK PCT CHNGE
A	AMDAHL CORP	15- 42	30 7/8	- 1/8	-0.4
N	BURROUGHS CORP	60- 88	82 5/8	- 1/4	-0.3
O	COMPUTER AUTOMATION	9- 27	25 3/4	+3 1/2	+15.7
N	CONTROL DATA CORP	39- 77	77 3/8	+8 3/8	+12.1
O	CRAY RESEARCH INC	39- 99	93 1/2	+11 1/2	+14.0
N	DATA GENERAL CORP	46- 87	75 3/4	+2 3/8	+3.2
N	DATAPOINT CORP	44- 97	94	+9 1/4	+10.9
N	DIGITAL EQUIPMENT	52- 96	95 1/2	+4 3/4	+5.2
A	EECO INC	9- 20	19 3/8	+ 7/8	+4.7
N	ELECTRONIC ASSOC.	6- 12	10 1/2	+ 1/2	+5.0
N	FOUR-PHASE SYSTEMS	23- 49	32 1/2	+4	+14.0
N	FOXBORO	31- 55	50	+ 5/8	+1.2
O	GENERAL AUTOMATION	7- 19	8 1/4	- 3/8	-4.3
O	GRI COMPUTER CORP	1- 3	1 1/8	+ 1/4	+28.5
N	HEWLETT-PACKARD CO	46- 81	81 1/8	+5 1/8	+6.7
N	HONEYWELL INC	69-101	93 1/8	+5 1/8	+5.8
N	IBM	90- 79	70	+4 3/8	+6.6
O	MAGNUSON COMP SYSTS	29- 36	35 1/4	+3 1/2	+11.0
N	MANAGEMENT ASSIST	9- 24	23 1/8	+3 5/8	+18.5
O	MANUFACTURING DATA S	22- 61	61	+2 1/4	+3.8
O	MINI-COMPUTER SYST	2- 6	3 5/8	+ 1/4	+7.4
O	MODULAR COMPUTER SYS	9- 30	29 1/4	+2 1/2	+9.3
N	NCR	52- 82	75 3/4	+9 1/2	+14.3
N	PRIME COMPUTER INC	15- 49	46 3/8	+5 1/8	+12.4
N	PERKIN-ELMER	25- 65	64 3/4	+6 3/8	+10.9
N	SPERRY RAND	42- 60	53	+2 7/8	+5.7
A	SYSTEMS ENG. LABS	11- 45	43 3/4	+1 5/8	+3.8
O	TANDEM COMPUTERS INC	13- 66	63 1/2	+9	+16.5
N	TEXAS INSTRUMENTS	79-144	142	+10 1/2	+7.9
A	WANG LABS.	17- 60	57 7/8	+4 3/8	+8.1

LEASING COMPANIES

O	BOOTHE FINANCIAL CP	13- 23	22	+1 1/2	+7.3
N	COMDISCO INC	9- 18	17 7/8	+2 3/8	+15.3
A	COMMERCE GROUP CORP	1- 2	1 1/8	0	0.0
A	COMPUTER INVSTRS SRP	2- 4	2 1/8	0	0.0
O	CONTINENTAL INFO SYS	2- 15	9 1/2	+ 1/2	+10.0
N	DATRONIC RENTAL	2- 4	3 3/4	+ 3/8	+11.1
A	DCL INC	3- 6	3 1/8	+ 1/8	+4.1
N	DPF INC	5- 12	8 5/8	+ 3/4	+9.5
A	ITEL	1- 15	2	0	0.0
O	LEASPAC CORP	1- 2	5/8	0	0.0
A	PIONEER TEX CORP	2- 4	3 5/8	+ 3/4	+26.0
N	RELIANCE GROUP INC	24- 79	72 1/4	+4 5/8	+6.0
N	U.S. LEASING	12- 23	21	0	0.0

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O	ADVANCED COMP TECH	1- 6	5 5/8	+ 5/8	+12.5
O	ANACOMP INC	7- 20	18	+ 3/4	+4.3
O	ANALYSTS INTL CORP	3- 8	8 1/4	+ 3/4	+10.0
A	APPLIED DATA RES.	6- 24	24	+5	+26.3
N	AUTOMATIC DATA PROC	31- 52	49 1/2	+2 1/4	+4.7
O	COMPUTER HORIZONS	1- 9	5 3/4	+2	+53.3
O	COMPUTER NETWORK	4- 9	6 7/8	+ 1/4	+3.7
N	COMPUTER SCIENCES	11- 30	27 5/8	- 1/8	-0.4
O	COMPUTER TASK GROUP	1- 20	19 1/2	+2 1/2	+14.7
O	COMPUTER USARE	2- 10	8 3/4	+1 1/2	+20.6
O	COMPUT AUTO REP SVC	4- 10	9 1/4	+ 3/8	+4.2
O	COMSHARE	11- 21	20	+2	+11.1
O	CULLINANE CORP	19- 53	43	+10 1/4	+19.4
O	DATA DIMENSIONS INC	1- 6	1 3/4	- 1/8	-6.6
O	DATATAB	1- 4	1	0	0.0
O	DSI CORP	4- 9	8 1/4	+1 1/4	+17.8
N	ELECTRONIC DATA SYST	19- 37	33 5/8	+1 1/8	+3.4
O	INFORMATICS INC	9- 25	22 3/8	+2 3/8	+11.8
O	INSYTE CORP	1- 3	2 1/8	0	0.0
O	IPS COMPUTER MARKET.	2- 4	3	0	0.0
O	KEANE ASSOCIATES	3- 9	5 1/2	0	0.0
O	KEYDATA CORP	2- 5	2 1/4	0	0.0
A	LOGICON	12- 27	25 5/8	+2	+8.4
O	MATHEMATICA INC	5- 18	15 1/2	+ 1/2	+3.3
O	MATHEMATICAL APP SRP	7- 33	32 1/2	+5 1/2	+20.3
O	NATIONAL DATA CORP	13- 28	28 1/4	+4 1/2	+18.9
N	PLANNING RESEARCH	9- 12	11 1/2	+1 3/4	+17.9
O	PROGRAMMING & SYS	1- 1	3/4	0	0.0
O	RAPIDATA INC	4- 9	7 7/8	0	0.0
O	REYNOLDS & REYNOLD	21- 34	24 1/4	+ 3/4	+3.1
O	STSC INC	6- 19	18 3/4	+3 1/4	+20.9
O	SCIENTIFIC COMPUTERS	6- 27	25 3/4	+2 3/4	+11.9
N	TYMSHARE INC	34- 72	71 1/4	+6 1/4	+9.6
A	URS SYSTEMS	9- 16	14 3/8	+ 5/8	+4.5
N	WYLY CORP	4- 20	19 1/2	+3 1/4	+20.0

PERIPHERALS & SUBSYSTEMS

N	AM INTERNATIONAL	13- 24	15 5/8	+ 3/8	+2.4
N	AMPEX CORP	14- 29	29 1/4	+3 1/2	+13.5
A	ANDERSON JACOBSON	9- 18	16 1/4	+ 3/4	+4.8
N	APPLIED DIG DATA SYS	5- 12	12	+ 1/4	+2.1
O	AUTO-TROL TECHNOLOGY	10- 62	57	+2 1/2	+4.5
O	BEEHIVE INT'L	3- 17	15 7/8	+1 3/8	+9.4
A	BOLT,BERANEK & NEW	12- 33	31 1/4	+3 1/4	+11.6
N	BUNKER-RAMO	17- 41	34 3/8	-1 1/8	-3.0
O	CAMBRIDGE MEMORIES	1- 9	4 1/8	+ 5/8	+17.8
N	CENTRONICS DATA COMP	23- 55	32 3/8	+2 3/8	+7.9
A	CETEC CORP	3- 7	7 1/8	+ 5/8	+9.6
O	COMPUTER DEVICES INC	5- 10	8 5/8	+ 5/8	+7.8
O	COGNITRONICS	1- 7	6	+ 3/8	+6.6
O	COMPUTER COMMUN.	4- 10	6 3/8	- 1/4	-3.7
O	COMPUTER CONSOLES	4- 29	23 3/4	+1	+4.3
O	COMPUTER TRANSCEIVER	1- 5	3	0	0.0
N	COMPUTERVISION CORP	24- 92	58 5/8	+10 7/8	+18.8
N	CONRAC CORP	13- 25	18 1/2	+ 1/8	+0.6

DATA ACCESS SYSTEMS

A	DATA ACCESS SYSTEMS	6- 17	15 1/4	+1	+7.0
A	DATA PRODUCTS CORP	11- 35	35 1/8	+5 1/2	+18.5
O	DATUM INC	2- 4	3 3/4	- 1/8	-3.2
O	DECISION DATA COMPUT	2- 6	5 3/8	+ 1/2	+10.2
O	DELTA DATA SYSTEMS	1- 3	2 5/8	+ 1/4	+10.5
N	DUCUMATION INC	7- 27	18 3/8	+1 3/8	+8.0
O	DATARAN CORP	6- 37	10 3/8	- 1/4	-2.3
N	ELECTRONIC M & M	3- 8	7 1/4	+ 1/4	+3.5
O	EVANS & SUTHERLAND	21- 72	71	+2 1/2	+3.6
O	FABRI-TEK	1- 4	3 1/2	+ 1/8	+3.7
O	GENERAL COMPUTER SYS	1- 6	5 1/2	+ 1/4	+4.7
O	GENERAL DATACOMM IND	12- 29	28 1/2	+4 1/2	+18.7
O	GENERAL TERMINAL CP	1- 4	1 3/4	- 1/8	-9.3
N	HAZELTINE CORP	12- 32	31 1/2	+4 1/8	+15.0
N	HARRIS CORP	25- 48	47 1/2	+4	+9.1
O	INFOMEX INC	1- 8	1	0	0.0
O	INFORMATION INTL INC	8- 15	14	+ 3/4	+5.6
O	INTEL CORP	45- 99	96 3/4	+6 3/4	+7.5
O	INTERSIL	13- 33	33	+ 5/8	+1.9
A	LUNDY ELECTRONICS	4- 12	11	+ 1/4	+2.3
O	MSI DATA CORP	5- 16	14 3/4	+ 3/4	+5.3
N	MEMOREX	10- 34	31 1/4	+ 1/8	+0.4
N	MOHAWK DATA SCI	13- 31	31	+4	+14.8
O	OMEX	2- 10	12	+2 1/2	+26.3
A	PARADYNE CORP	18- 52	51 1/2	+4 5/8	+9.8
A	PENRIL CORP	3- 15	12 1/8	+ 5/8	+5.4
O	RAMTEK CORP	10- 18	17	+1 1/2	+9.6
O	RECOGNITION EQUIP	5- 18	17 1/2	+2 1/8	+13.8
O	SCAN DATA	1- 5	2 1/2	0	0.0
N	STORAGE TECHNOLOGY	12- 23	23 3/8	+2 1/8	+10.0
O	SYKES DATATRONICS	14- 47	45 1/4	+1	+2.2
O	T BAR INC	14- 21	19 1/2	- 1/4	-1.2
A	TEC INC	3- 9	6	0	0.0
N	TEKTRONIX INC	42- 70	66 1/2	+2 1/4	+3.5
N	TELEX	3- 6	5 5/8	+ 3/8	+7.1
O	TESDATA SYSTEMS CP	9- 26	14 1/8	+1 5/8	+13.0
A	TIMEPLEX INC	7- 29	28 3/4	+2	+8.0
O	WILTEK INC	1- 3	2 1/2	0	0.0

SUPPLIES & ACCESSORIES

A	AMERICAN BUS PRODS	9- 15	14 3/8	+ 7/8	+6.4
O	BALTIMORE BUS FORMS	1- 2	3/4	0	0.0
N	BARRY WRIGHT	8- 22	21 3/4	+1 5/8	+8.0
O	CYBERNATICS-INC	1- 1	1 1/4	+ 1/8	+11.1
A	DUPLER PRODUCTS INC	11- 16	14 3/4	0	0.0
N	ENNIS BUS. FORMS	13- 21	18 1/8	- 1/4	-1.3
N	3M COMPANY	46- 63	57	-2 1/4	-3.7
O	MOORE CORP LTD	27- 37	34 1/4	+ 1/8	+0.3
N	NASHUA CORP	23- 35	25 1/2	+1 1/8	+4.6
O	STANDARD REGISTER	22- 35	30 1/4	- 3/4	-2.4
A	TAB PRODUCTS CO	13- 34	34 1/4	+4 3/4	+16.1
N	WABASH MAGNETICS	11- 18	15 1/2	+ 3/8	+2.4
N	WALLACE BUS FORMS	23- 45	44 3/4	+1 1/4	+2.8

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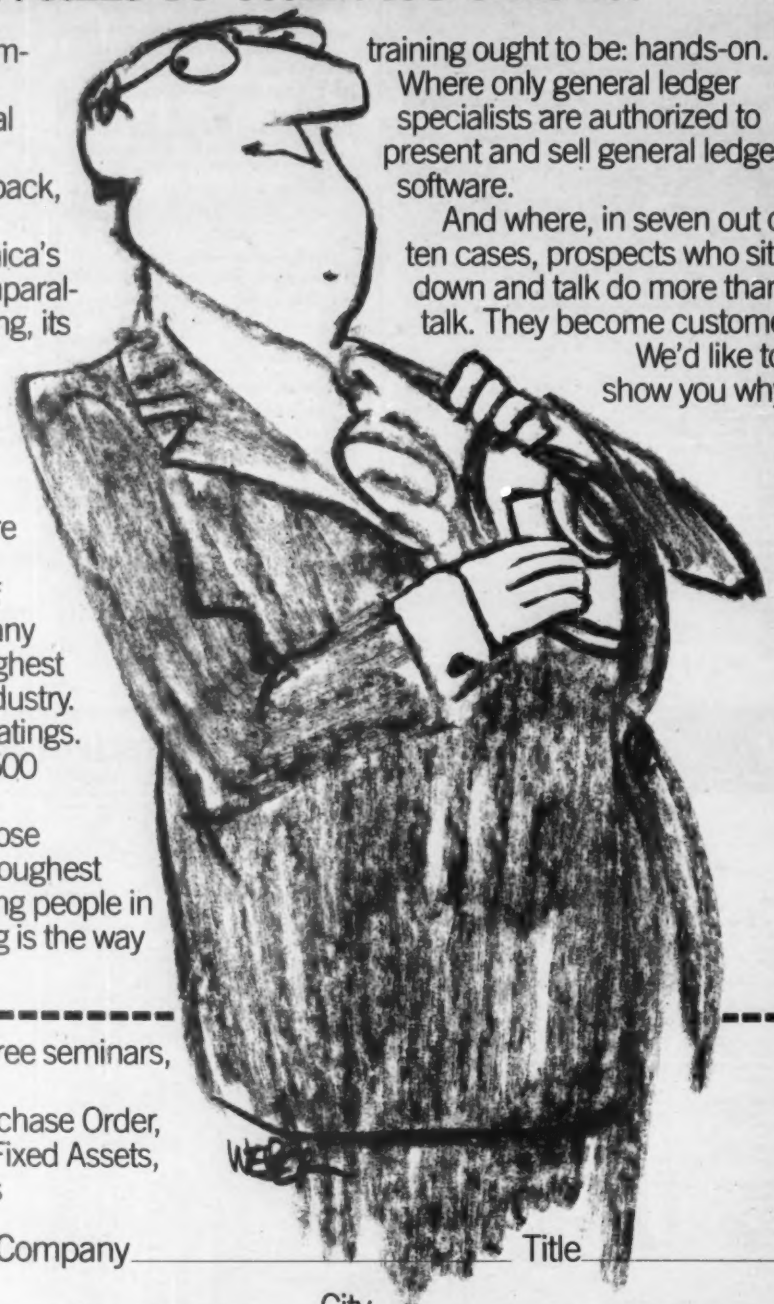

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